

Municipal Journal

Volume XXXV.

NEW YORK, DECEMBER 25, 1913.

No. 26

CLEANING WATER MAINS AT HARTFORD*

Capacity Reduced Thirty or Forty Per Cent by Tuberculation and Deposits—Cleaning Cheaper Than Additional Main—Details of Cleaning—No Increased Danger of "Red Water" or Tuberculation.

By C. M. SAVILLE†

The city of Hartford, Conn., is supplied with water by gravity from a system of six reservoirs in West Hartford, distant about $6\frac{1}{2}$ miles from Hartford City Hall. Nearly twelve miles of watershed are tributary to this system, the drainage from all of which finally flows to Reservoir No. 1. The effluent gatehouse is located at the base of the dam of this reservoir, and from it lead the three mains which supply the city, two 20 inches and one 30 inches in diameter. The first main laid was of the well-known cement-lined character, and was put into service in 1867. On account of frequent breaks, portions were replaced from time to time with cast-iron until now this is wholly a cast-iron line. Although the older in point of original location, this main is actually the lesser in age of the two 20-inch mains. In speaking of this main hereafter, it will be known as the south 20-inch main. The other 20-inch main, known hereafter as the north 20-inch, was laid in 1875, and is, therefore, about 37 years old. The 30-inch main was laid in 1896 and is 16 years old.

The average consumption for the year 1911 was at a rate of 8,051,000 gallons per day. The maximum monthly rate in 1912 was 9,245,000 gallons per day, the maximum rate at any period during the day being about 13,700,000 gallons, while the minimum flow from midnight to 5 a. m. was at the rate of 4,500,000 gallons per day. The drop in pressure at City Hall due to this difference in rate was 18 pounds before cleaning, and the gain due to the cleaning of one 20-inch main is estimated to be from 2 to 3 pounds, the actual loss with the same flow under present conditions being from 15 to 16 pounds. For the preliminary study simultaneous measurements were taken in all three of the mains at the time of average daily flow. Previous to these tests, the 30-inch Venturi meter on the supply line and the pitometers used in the work were checked against each other, the pitometers being found to read about 1.5 per cent in excess of the meter reading. The results of the tests on the mains have been summarized and are given in the following table, together with certain comparisons that relate to age, carrying capacity and present conditions of these supply mains:

*Paper before New England Water Works Association.

†Chief Engineer, Board of Water Commissioners, Hartford, Conn.

From the above it was seen that the coefficients (Col. 3) for the 30-inch and the north 20-inch mains were unusually low, while the south 20-inch main was in about the condition that might have been expected. If these pipes were cleaned, it was estimated that the present system should be capable of delivering 20,000,000 gallons per day to the city with the same loss of head that then existed (18 pounds at City Hall); and, if not cleaned, it appeared that under present conditions of demand the construction of a new main would be an immediate necessity.

Using the consumption figures from the Venturi meter record for June, 1912, the following estimate of future consumption was made: Average rate, 9.13 million gallons per day and maximum rate, 14.5 million gallons per day, or 58 per cent excess maximum to average rate. At an average annual rate of increase of 500,000 gallons per day in five years the additional amount required would be 11.63 m.g.d. and 18.4 m.g.d., respectively, for average and maximum drafts. Therefore, if the above assumptions are correct and if the present system could be restored to its original capacity, it should be good for five years more, even with a rate of deterioration twice that usually assumed.

If a new supply pipe was laid it would be at least 36 inches in diameter and about 33,000 feet long ($6\frac{1}{4}$ miles). At a minimum price of \$8.25 per linear foot, this line would cost about \$270,000, the interest on which at 5 per cent simple interest would be \$13,500 per year, and at compound interest the charge would be \$74,500 in five years.

The preliminary estimate for cleaning 3 miles of 30-inch and 6 miles of 20-inch was \$15,300, a little more than the interest for one year on the amount necessary to lay a new 36-inch main. If, therefore, the construction of the 36-inch main could be put off for five years without detriment to the service, the saving to the city was estimated to be about \$60,000.

On account of the benefit which would result to the city if it were possible even partially to restore the carrying capacity of the existing mains by cleaning them, information was sought from various cities where the process had been applied. Very courteous and complete replies were received, and there seemed to be a unanim-

Diameter, inches	When laid	Coef. for Kutter's Formula as per Weston.			Discharge in m. g. d. Loss of head, 18 pounds.			Age	
		Existing	According to age	New laid or cleaned	Present	New laid or cleaned	After 10 years	As per coef.	Actual
30....	1896	81.6	91.5	112	8.5	11.7	10.2	28	16
North 20....	1875	63.4	75.7	110.8	2.4	4.2	3.7	65	37
South 20....	1867	74.0	75.0	110.8	2.8	4.2	3.7	40	25-40
					13.7	20.1	17.6		

NOTE—Date of laying south 20-inch main is date original main was laid.

ity of opinion that the work done was successful in operation and satisfactory in result. Some of the cities from which replies were received were:

City	Sizes Cleaned, inches	Remarks
Cincinnati, O.	6 to 16	Third contract for work.
Rochester, N. Y.	6 to 20	About 25 miles cleaned in all.
Newton, Mass.	24	
St. Louis, Mo.	15 and 20	
Brooklyn, N. Y.	6 to 36	
Atlanta, Ga.	30	
Am. W. W. & Guar. Co. .	4 to 20 40 to 50	miles cleaned this season.

The list prices quoted by the National Water Main Cleaning Company, of New York, for doing work in the distribution system were:

PRICES PER LINEAR FOOT OF PIPE.

6-inch—16 cents	12-inch—22 cents	24-inch—40 cents
8-inch—17 cents	16-inch—26 cents	30-inch—65 cents
10-inch—18 cents	20-inch—30 cents	36-inch—80 cents

These were stated to be for average conditions for lengths of five miles or more given only for purposes of preliminary estimate, and were submitted with the reservation that local conditions might cause considerable variation either way. In Hartford a price of 28 cents per linear foot for 20-inch was given for a 3-mile contract, with a further reduction if a greater length was cleaned. The conditions were exceedingly favorable for a large part of the way on account of few consumers on the line, advantageous location of gate valves and blow-offs for cutting out sections of proper length and also because of a parallel main with cross-connections which gave ample water for operating the machine without interference with the city supply.

A contract was entered into September 4, 1912, with the National Water Main Cleaning Company to clean, on trial, 3 miles of 20-inch pipe, and if satisfactory results were obtained the cleaning process might be continued through several miles additional of 20-inch and 3 miles of 30-inch pipe.

Work was begun September 6 and suspended on October 24 on account of scarcity of water in the reservoirs. The results were very satisfactory and during this period (49 days) a total of 33,093 linear feet ($6\frac{1}{4}$ miles) was cleaned. On this section there were 154 service pipes which were shut off during cleaning and only 4 were at all interfered with by the cleaning operations. Three of these were extension meters located at the street line with no curb cocks, and it was necessary to remove the meter and clean out the dirt. The other service affected was plugged but was easily relieved by a force pump. The following is a typical log of the operations:

October 15.—Location, Farmington avenue and Asylum street, Sigourney street to Ford street; distance, 2,747 linear feet.

During afternoon 20-inch pipe exposed at Sigourney street and at Union Place. Cleaning machine put into a 9-foot piece of pipe and ready for insertion into the pipe line when cut was made.

8.30 p. m.—Section, Gillette street to Cathedral, shut down.

9.40 p. m.—Above section completely drained. Cutting began at this time at Sigourney street.

1.00 a. m.—Section, Cathedral to Ford street, shut down.

2.00 a. m.—Pipe cut out at Union Place and riser wedged into place.

2.33 a. m.—Gate opened at Gillette street to start machine.

2.50 a. m.—Machine reached Union Place.

5.00 a. m.—Machine having become wedged in riser pipe was removed at this time.

6.25 a. m.—Section closed in, joints made up, and water turned into section.

The usual force employed on this work was a superintendent, a foreman, a calker, 14 laborers and a double team for carting pipe, materials and supplies.

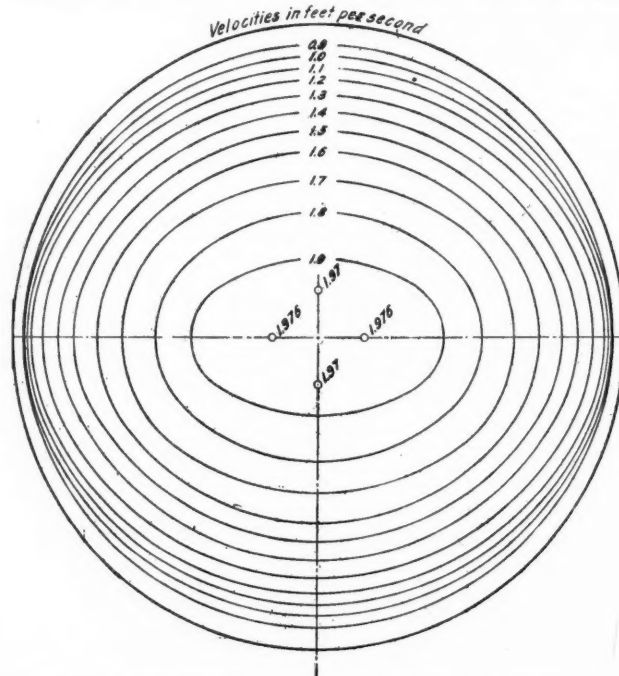
Under average conditions 3,000 linear feet was found to be the maximum effective length for cleaning. The contractor stated that 5,000 feet had been successfully cleaned by him elsewhere, although in some places it had been possible to go only 1,500 feet at a time, using water to drive the machine. If the machine is drawn through by a cable, the length of section is from 500 to 1,200 feet. It is stated that the machine can be operated by water under heads of as low as 10 or 12 pounds. The least available head on the Hartford lines was somewhat greater than this.

The pipe machine used in cleaning the mains consists of three distinct sections attached to each other by a flexible joint in the connecting shaft, which is central in all of the sections. These joints move readily and allow the machine to pass through ordinary water pipe curves if the radius is not too short. The first section consists of three spiders fastened to the shaft, which are armed with saw-tooth blades that project at right angles to the axis of the machine. The function of these blades is to cut up and tear loose incrustation and scale that adheres to the pipe walls.

The second section is made up of two spiders armed with smooth scrapers. The function of these blades is to scrape away all matter left clinging to the pipe by the first section.

Behind these two sections is a double piston fitting the pipe very closely, with leather gaskets pressed out by steel springs which are continuous around the entire circumference. The pistons are fitted with dampers which can be adjusted to the pressure of water and so regulate the quantity needed to wash ahead the scale and other matters cleaned from the pipe. Behind each spider and loosely fitting on the center shaft are three somewhat flexible metal disks whose function it is to deflect the wash water towards the pipe walls and out through the cleaning blades where the high velocity helps remove some matter and keeps the whole mass moving along with the machine.

Behind the pistons is another section which carries two rows of right and left offcast scrapers. These are very heavy and are designed to smooth off the surface and leave a clean, smooth waterway. These blades are allowed only just to touch the pipe walls, their position being kept by case-hardened rollers that run on the pipe



CONTOURS OF VELOCITIES IN NORTH 20-INCH MAIN BEFORE CLEANING.

wall. The gross diameter of the machine used in the 20-inch mains is $21\frac{1}{2}$ inches, the steel springs letting down at entrance and so keeping the machine firmly centered in the pipe. The steel blades are made especially for this purpose, and are nearly all replaced after each draw. This replacement, of course, depends largely on the character of the incrustation, and when mud alone is found the blades may require very little renewal.

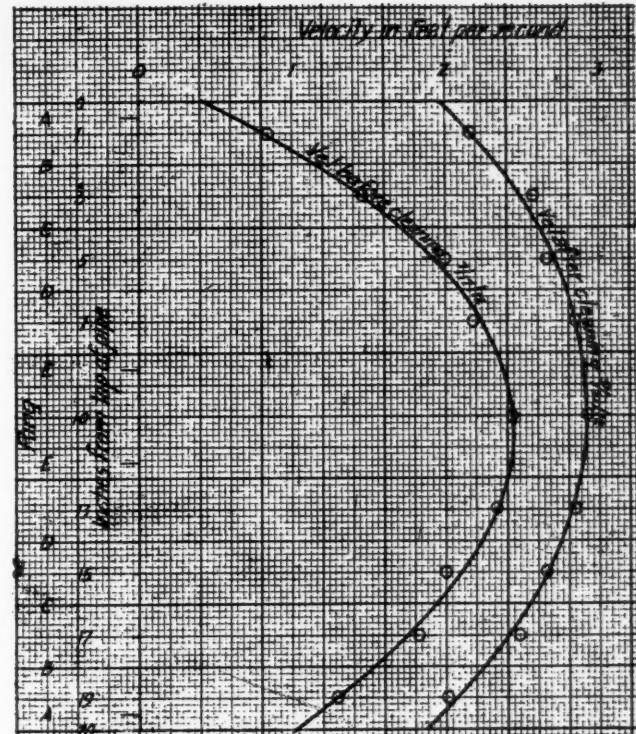
Previous to the cleaning work, a very thorough survey was made of the capacity of the pipe line by the use of the Pitometer, and similar tests were made after the work was finished. A typical summary of the results of this work is given below:

Pipe cleaned—North 20-inch main, Farmington avenue.
Section—Reservoir No. 1 to Vanderbilt Hill.
Length—First test, 16,400 feet; second test, 14,650 feet.
Pipe laid in 1876; age, 37 years; kind, cast-iron.

	(1)	(2)
Date of test.....	August 22, 1912	October 2, 1912
Make of gauge.....	Crosby	American
Unit of gauge.....	1-pound	1-foot
Head lost.....	20' to 55'	20' to 50'
Range of velocity (feet per second).....	1.69 to 2.40	2.84 to 3.97
Possible error.....	Per pound, 3.5%	Per foot, 1.5%
Mean coefficient in Chezy formula.....	69	111
Increase in capacity.....	61%	(new) 111
Average coefficient in Chezy formula	{ Weston (37 y.) 75 { Williams and Hazen (37 y.) 76	(new) 111 (new) 116

The loss of head was about the same in both cases, and sufficiently large so that an error of one pound or one foot would be comparatively negligible.

The north 20-inch main was cleaned from the reservoir to Union Place, a distance of about five miles. The south 20-inch main has been cleaned from the reservoir east about $1\frac{1}{4}$ miles. Tests of the flow made before and after cleaning indicated that in both pipes the carrying capacity had increased sufficiently to compare with Weston's tables for new 20-inch pipes. This is equivalent to a coefficient of 111 in the Chezy formula, the



DISTRIBUTION OF VELOCITY IN 20-INCH MAIN, BEFORE AND AFTER CLEANING.

quantity is believed to be a reliable estimate of the amount per linear foot:

	Gallons
Quantity required to fill 1 foot of 20-inch pipe.....	16.3
Quantity used in cleaning.....	24
Adding 25% for emergencies, etc.....	9.7

Total estimated amount per linear foot.....50.

The total distance cleaned was 33,093 linear feet ($6\frac{1}{4}$ miles), and it is estimated that 1,655,000 gallons of water were used. This amount is about $\frac{1}{5}$ of one day's supply to the city. The following tables present a summary of the work done and the results obtained:

Location	Date tested	Length, feet	Range of flows, m.g.p.d.	Lost head per 1,000'	Chezy coefficient
Northerly 20-inch main.					
Reservoir to Le May's:					
Before cleaning.....	8/31/12	5,450	3.3 to 4.7	2.90 to 7.65	60 to 67
After cleaning.....	9/21/12	5,450	3.6 to 5.3	0.64 to 2.09	124 to 159
After cleaning.....	9/26/12	5,450	2.5 to 5.3	0.96 to 2.57	109 to 125
Le May's to West Hartford Center:					
Before cleaning.....	9/14/12	4,430	2.8 to 4.2	3.80 to 7.00	50 to 56
After cleaning.....	9/26/12	3,750	3.6 to 5.2	1.70 to 2.90	94 to 115
West Hartford Center to Highland Street:					
Before cleaning.....	9/10/12	6,420	3.1 to 5.8	2.03 to 8.46	69 to 75
Vanderbilt Hill to Broad Street:					
Before cleaning.....	10/ 3/12	10,180	2.4 to 4.3	1.81 to 5.81	61 to 65
West Hartford Center to Vanderbilt Hill:					
After cleaning.....	10/ 2/12	5,450	4.0 to 5.6	1.18 to 3.63	110 to 112
Reservoir to Highland Street:					
Before cleaning.....	9/27/12	16,300	2.4 to 3.4	1.40 to 2.89	67 to 70
Reservoir to Vanderbilt Hill:					
After cleaning.....	10/ 2/12	14,650	4.0 to 5.6	1.55 to 3.01	110 to 112
Southerly 20-inch main.					
Reservoir to Highland Street:					
Before cleaning.....	8/27/12	16,300	2.58 to 3.91	1.52 to 3.55	73 to 75
Before cleaning.....	10/14/12	16,300	3.25 to 4.08	2.17 to 3.44	76.3 to 76.9
Reservoir to Westland Street:					
After cleaning.....	10/28/12	6,400	4.1 to 5.4	1.61 to 2.70	110 to 119

resulting increase in capacity being 61 per cent and 50 per cent, respectively, for the north and south 20-inch mains.

Several readings of the amounts of water used during the cleaning were made from the records of the Venturi meter at the reservoir gatehouse, and the following

On account of a suggestion that the cleaning of water mains might have effect in causing or aggravating the so-called "red water" trouble, samples from the cleaned and uncleared mains were sent to Jas. A. Newlands*

*Consulting Chemist and Bacteriologist, Middletown, Conn., and Chemist of the Connecticut State Board of Health.

with the request that especial attention be given in his examination to detecting any indications of "red water." The following extracts are given from Mr. Newlands' reports on the samples submitted:

Report on Sample No. 1352 (sample taken October 1, 1912, from 20-inch main that has been cleaned):

This sample, which I understand is taken from the clean main section, shows only very slight differences from Sample No. 1353 taken from the uncleaned main, and these differences are so slight as to be within the limits of laboratory error and the slight variation which might be expected in two samples from different points on the same pipe line. On a long line of cleaned pipe we might expect that, where the inner surface had been cleaned down to the iron, at such points there would be some reductions of the oxide of iron by the action of decomposing algae growths and other organic matter. This would result in iron being taken up by the water and a consequent increase in color. As the amount of dissolved oxygen in this water is probably high enough at all times to supply the oxygen required by the organic matter there probably will be no appreciable effect on the color and iron content of the water. These samples show none, the color being the same in both cases, while the iron amounted to 0.3 part per million in this sample and 0.2 part in Sample 1353.

Letter of October 7, 1912: With reference to the tap and hydrant samples I will say that the results obtained do not show any appreciable effect of the cleaned main (on) the appearance or quality of the water. Under some conditions, as I have suggested, it is quite possible that for a time there might be some increase in color and iron matter content, due to the action of decomposing organic matter on the fresh iron with which it comes in contact; but the amount of organic matter in your reservoirs does not usually become great enough to exhaust the oxygen dissolved in the water, and I do not anticipate any material effect on the color of the water. However, it is difficult to determine how the various types of water will act under varying conditions, and I think it will be worth while to keep track of the relative colors of the waters in the cleaned and the uncleaned mains as the work goes on.

Report on Sample No. 1378 (taken October 28, 1912, from south 20-inch main that had been cleaned):

These results show practically no differences in the physical appearance of the chemical constituents of the water as compared with Sample No. 1370 taken from the north 20-inch main. No differences were noted in the color, turbidity or sediment of the two samples, although we might expect slight differences even in two samples taken from different points in the same main. There is no indication at this time that cleaning the main has resulted in the beginning of "red-water" trouble.

Letter of November 4, 1912: I have looked the samples over carefully for evidence of "red-water" trouble, but there appears to be no such effect at this time. The results on the two samples are more nearly alike than we usually find them, as it frequently happens that samples, although taken from two points on the same main, will show some differences in the amount of turbidity and sediment especially, due to unavoidable differences in the amount of sediment stirred up when the samples are taken. There is no evidence in these results, therefore, to show that the cleaned main has any effect on the appearance of the water at this time.

Some criticism of the work was made by a writer in one of the local newspapers that the cleaning of the pipes destroyed the inner coating, and the intimation was that the rusting of the mains would probably proceed very much more rapidly in the future than in the past. It has been stated by some engineers that the cleaning of cast-iron pipe frequently does increase the rate of tuberculation and under some conditions that may be true. Previous to undertaking the Hartford work, inquiry was made concerning this matter of various water departments where the pipe had been cleaned. Very little information was obtained regarding the rate of returning incrustation, but regarding the removal of the coating the opinion of all who had made examination was that the inside of the pipe was uninjured. Observations made on the ground showed no evidence of damage of this kind. The hardest test probably was encountered when the machine was pulled into the 9-foot piece of pipe made ready for insertion in the line.

In several cases this section was examined and no removal of the coating was apparent.

A diagram is included for the purpose of showing the results of cleaning on the velocity. The references to meter Company. In this connection it may be said that the incrustation removed was in places over an inch thick nearly around the pipe. Besides this, considerable quantities of pipe moss (*Paludicella*) were found near the reservoir end of the mains.

Before cleaning.				After cleaning.			
Ring	Area	Vel.	Vol.	Ring	Area	Vel.	Vol.
A	0.415	0.89	0.37	A	0.415	2.02	0.84
B	0.698	1.34	0.94	B	0.698	2.30	1.61
C	0.524	1.82	0.95	C	0.524	2.58	1.35
D	0.349	2.17	0.76	D	0.349	2.77	0.97
E	0.196	2.40	0.47	E	0.196	2.90	0.57
Total..2.182			3.49	2.182			5.34
Mean vel. =		3.49	1.6;	5.34			2.45;
		2.182		2.182			
		1.6				2.45	
			= 0.66 coef.*				= 0.84 coef.*
		2.43				2.92	
*Coefficient = $\frac{\text{mean velocity.}}{\text{center velocity.}}$							

COMBINING MUNICIPAL WATER SYSTEMS.

Norfolk and Portsmouth, Va., neighboring cities, have municipal water works systems, each of which has been found to be reaching the limit of its resources, especially for meeting unusual demands; and the cities are now considering an arrangement for combining the plants for the mutual benefit of both. The consulting engineer of the Norfolk Water Commission, Allen Hazen, in a communication to the commission points out a number of advantages which would be obtained by such combination.

According to the conditions as outlined by him, the two systems would in an important measure supplement each other. This is because of the fact that the Norfolk system contains a storage capacity which is larger than is warranted by the tributary drainage area, while on the other hand the Portsmouth drainage area supplies more water than it has storage capacity to fully utilize. By connecting the two systems the surplus water on the Portsmouth drainage area would be stored in the Norfolk reservoirs and be available to both cities, thus giving a greater supply (estimated at 2,000,000 gallons a day) in time of drought than both together can now obtain under separate systems. The quality of the two waters is practically the same. The two systems could be joined by laying about 2½ miles of large pipe through Norfolk, Portsmouth and Berkley, about half a mile of which would be under water, there being three submarine crossings under rivers. The pipe would be laid within two or three blocks of the waterfront and connect with all existing pipes in that district.

Another advantage is that the pipe line from the Norfolk reservoirs to the city is large, while that of the Portsmouth system is small. The latter, however, would be sufficient for ordinary service and for filling the reservoirs during the night. For unusual demands in Portsmouth which could not be sufficiently met by the smaller line from its reservoirs the supply could be supplemented by an additional amount through the Norfolk line from the Norfolk reservoir. The city of Norfolk also would benefit in that it could draw upon the Portsmouth supply through the Portsmouth lines in case its own lines should prove too small; and in any case the pressure in both cities would probably be increased by the double source of supply and double lines of feeders.

Both cities are now reaching the limits of their present water resources, and although this combination will en-

able them to postpone the day when it will be necessary to secure an increase in supply, when that time does arrive such increase can probably be obtained at less cost by means of a combined system than by two separate systems. It is recommended, however, that this necessity for additional supply be postponed as far as possible by the adoption of the use of meters, as there appears to be a considerable amount of waste of water in both cities.

BROAD STREET LIGHTING SYSTEM

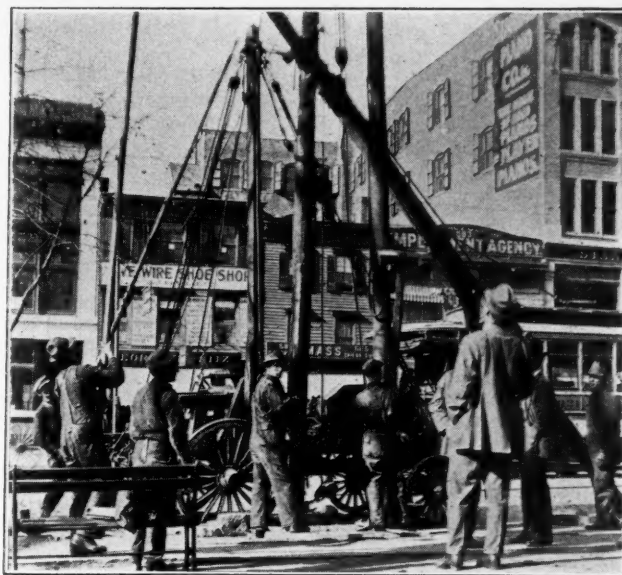
New System of Arc Lamps in Newark—Former Illumination Too Brilliant—Combined Trolley and Light Poles.

Broad street, in Newark, N. J., was one of the first streets in the country to be lighted with an intensive and ornamental system of street lighting; and, with flaming arc lamps of very high candle power, located at one hundred foot intervals on both sides of the street, it was perhaps the most brilliantly illuminated street in the country. In fact, the criticism had been made at a convention of the National Electric Light Association that the illumination was too intense. At any rate, there was much wasted light, as the illumination of the clouds could be seen miles away. The cost per year of these lamps was excessive—\$300 each, or about \$20,000 per mile of street.

For these lights there have recently been substituted



NEW POLE AND LIGHT. OLD POLE AT RIGHT.



ERECTING LIGHT POLE. GIN POLE IN POSITION.

the General Electric Type W multiple long-life arc lamps, which will cost only \$130 per year each. These are of only 800 candle power each, but the distribution of the light is so superior to that of the lights formerly used that the usefulness of the lighting system has apparently not been decreased. It is possible to read printed matter—a railroad transfer—in any part of the street. At the same time a great improvement has been made in the general appearance of the street by the adoption of a new pole which carries both the lighting and the trolley wires, thus decreasing the number of poles in the street by one-half. The old trolley and some of the lighting poles were unsightly wooden poles.

Part of this street formerly had double arc Toerring lamps, placed approximately 100 feet apart on ornamental goose-neck poles, 25 feet from the ground. The cost of these lamps was at one time \$312 per year, later \$300. Another part of the street had double arc Scott lamps on ornamental goose-neck wooden poles, 17 feet from the ground, the cost of which at one time was \$270 and at another time \$300 per year. Both these lamps were of nominal 9,000 candle power, contract requirements, 1,300 watts at the lamp. Another part of the street had Excello lamps hung in pairs 125 feet apart, on wooden poles, 17 feet from the ground. These lamps are of nominal 4,500 candle power, contract requirements, 660 watts at the lamp.

The cost of this illumination was \$21,896 per mile, including in the calculation an intersecting street similarly lighted—altogether a length of 1.4 miles of intensely lighted streets. These lights required considerable care, one or more men being on duty all the time to watch them; and, in spite of this, their per cent of outages was large, as much as 8½ per cent for one part of the street.

As the new poles carry the trolley wires, they have to be set opposite instead of staggered as before. The combined poles are forty feet long, made of steel, carrying two castings besides the bracket. Six feet of the steel pole is below the surface of the sidewalk, set in concrete. The lamp itself is about 25 feet from the ground. The bracket is a straight arm with ornamental scroll work, which gives it stability. The problem of a combined trolley and lighting pole is to prevent outages due to vibration. The pole is inclined slightly backward towards the buildings. The concrete setting gives it great stability, and provision is made for tying

the pole back to the building by guy wires if necessary. Moreover, the lamp is of special construction, an improved form of the Type W lamp, which is designed to operate even with considerable vibration. The improvements are in the mechanism and shunt coils and are largely the work of the engineers of the public service electric company which makes the installation and furnishes the current. The poles were supplied for this company by J. W. Bache & Co., New York, agents of the Morris Iron & Steel Company.

This type of lamp is made by the General Electric Company for large area lighting. It produces a powerful, penetrating light and is economical in use. It operates on about 7.5 amperes, 50 volts. The nominal candle power is stated to be 800; but, owing to the use of reflecting surfaces, the effective illumination is very great. The maximum illumination is at 20 to 30 degrees below the horizontal. It gives from 13 to 21 downward lumens per watt. One set of carbons burns from 100 to 120 hours without attention. In this installation the lamps are all turned on at a switchboard in the central station.

The general appearance of the street is much improved, as compared with its former condition, by day, as well as by night, owing to the decreased number of poles. The design of the poles is attractive; the regularity of their positions opposite each other gives unbroken stretches of street 125 feet long. The intervals seem symmetrical and harmonize with the width of the street, which is 96 feet between curbs. At night the effect is very pleasing. The street is sufficiently illuminated for any useful purpose, and at a distance the regularity of the spacing and the brilliancy of the lights are notable.

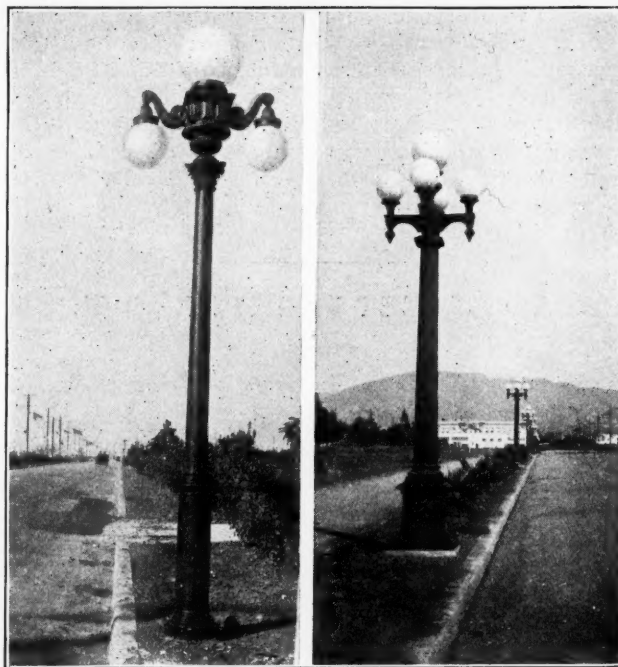
The installation of the poles was made by the Public Service Company. The principal appliance used was a construction wagon carrying a pole the foot of which was permanently pivoted to the body of the wagon. This pole was used to raise an ordinary gin-pole, which in turn was used to raise the iron lighting pole. The horses were unhitched from the wagon to supply the power, through suitable rigging, for raising the poles. The two cast-iron pieces were held securely in place on the steel core at points higher than their final position by blocking bolted in place. When the pole had been dropped into the hole, concrete was filled around it and the castings dropped into place. Another gang following later put up the brackets and hung the lamps.

LONG ILLUMINATED BOULEVARD.

By ALBERT MARPLE.

It is claimed that the new electric boulevard in the San Fernando valley, fifteen miles north of Los Angeles, California, the first stretch of which has just been completed, will be the longest ornamentally lighted thoroughfare in the world, outside of an incorporated city. The stretch just finished is fifteen miles in length and contains 375 three-light electroliers. The contracts call for a thirty-mile boulevard lighted by 600 such electroliers. This boulevard joins the cities of Van Nuys, Marion and Owensmouth, through which cities the boulevard is continued; the only difference within the cities being that there the electroliers are of five lights each.

Inside the city's limits all of the lights are upright, while those outside consist of one upright and two inverted globes. The center light of the city system standards is allowed to burn throughout the night, while the four side lights and the electroliers outside the cities are darkened at 1 o'clock in the morning. The portion of the system already finished includes Sherman Way, North Sherman Way and West Sherman Way. South



STANDARD FOR
HIGHWAYS.

STANDARD FOR
CITY STREETS.

Sherman Way is already paved and lighted and at a very early date the state highway will connect it with West Sherman Way, thereby making a circuit of electrically lighted concrete and macadam boulevard. All of the wires of this system are run in underground conduits. The complete system of electroliers will cost \$70,000.

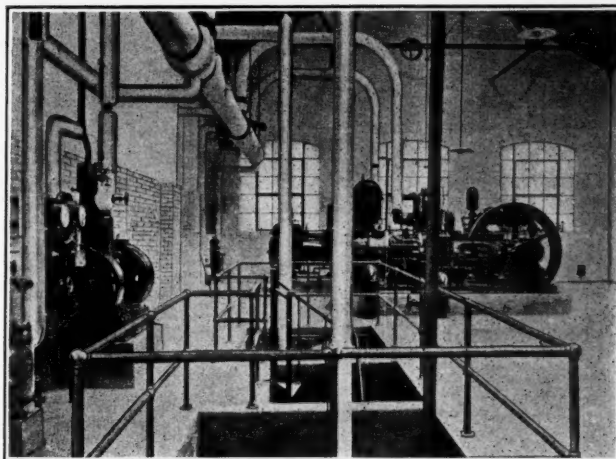
SOUTH ORANGE WATER WORKS

Municipal Plant with Supply from Deep Wells—Protection Against Pollution—Reservoir with Roof Supported by Steel Columns.

The village of South Orange, N. J., has just begun taking its water supply from a municipally owned plant which has a maximum daily capacity in its pumping machinery of 1,440,000 gallons per day, and in its wells of 1,693,000 gallons, and which cost about \$221,750, exclusive of the distribution system. Previous to this the village had been obtaining water from the Commonwealth Water & Gas Company but was dissatisfied with both the pressure and the quantity, and in 1910 agitation was begun for a municipal supply. Fortunately, the village had from the first owned the water mains and was only one of several municipalities which were served by the water company; it consequently avoided the difficulties which frequently arise where the company is a local one and owns the street mains. The consumption had been increasing rapidly, having been 64,432,500 gallons in 1902 and 144,859,600 gallons in 1912—an increase of more than 100 per cent in ten years. It was believed that a point had been reached in the consumption and growth where it would be economical to operate a municipal plant. The village board employed John J. Boyd to investigate the possibilities of a water supply, and his report was later reviewed by Nicholas Hill, Jr., and C. C. Vermeule. All agreed that an adequate supply of good water would be obtainable by driving wells, and a test well was driven in 1911 by which water was found at a depth of 274 feet, which gave a flow of 350,000 gallons a day which was of excellent quality. A second well, driven 100 yards from the first, yielded practically the same amount of water

with no falling off in the total when the two were pumped together.

It was necessary for the village to obtain state authority to build water works, and the necessary bill was passed and signed in March, 1912. Under the law of New Jersey the state water commission is custodian of all waters within the state, and it was necessary to apply to this commission for permission to obtain the water for the plant, which was readily granted. The State Board of Health also tested the water as to its quality and approved of the same. Seven wells were driven, the flow in which varied from 70,000 gallons per day to 350,000 gallons. The supply from each well was tested by the chemists of the State Board of Health, the village Board of Health and the consulting engineer, and all pronounced the water from each well to be of good quality and free from any objectionable impurity. In driving the wells there were found first a top layer of earth, then 12 feet of clay, then a layer of hardpan, another layer of clay about 9 feet thick, these several layers totaling over 30 feet; and under them was from 230 to 270 feet of solid rock, under which was found the water-bearing stratum. The wells varied in depth from 274 feet to 300 feet, except that one of them was continued to a depth of 400 feet, the last named yielding only about one-third as much as the others. In order to prevent any ground water from finding its way downward along the outer surface of the well tube and so contaminating the supply, an iron pipe well lining was driven down into the rock several feet, making a close joint; and, in addition, a block of concrete 15 inches thick and 8 feet across was built around the top of each well. The well lining was in each case 8 inches in diameter, and inside of this was placed the necessary lengths of 5-inch and 4-inch pipe for using the air lift process in raising the water. The air is driven down between the 4-inch and 5-inch pipes, and the combined air and water rise through the 4-inch pipe, from the top of which it flows by gravity to a basin at the pumping



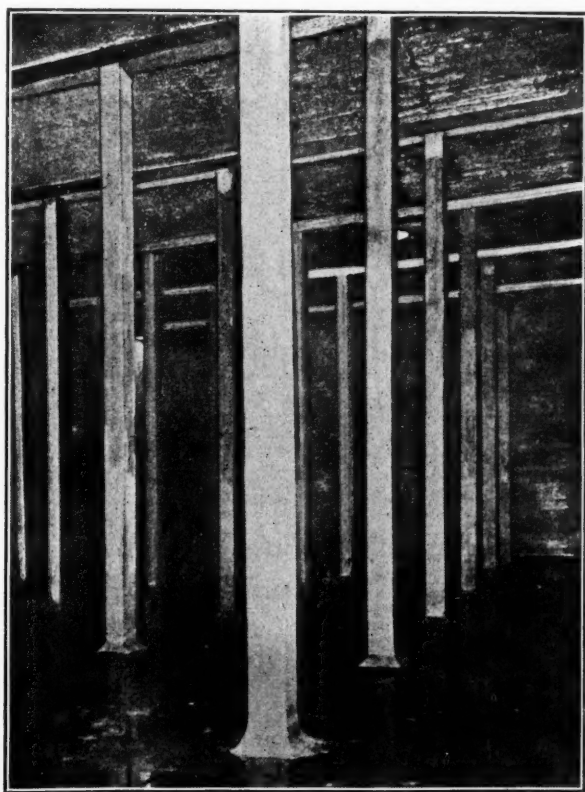
VIEW OF PUMP ROOM.

station. The water is pumped from this basin to a reservoir on the hill, the rising main being connected with the distribution system, making the system a direct-indirect one.

There are two 210-horse-power water-tube boilers, manufactured by the Murray Iron Works, working at a normal pressure of 150 pounds. These furnish the steam for two triple expansion pumping engines made by Epping Carpenter Company, with a guaranteed duty of 80 million foot pounds per thousand pounds of dry steam, and having a capacity of 800 to 900 gallons per minute each. Steam is also provided for two cross-compound, 2-stage, Meyer valve air compressors of Laidlaw-Dunn-Gordon manufacture, with a capacity under present conditions of 1,300,000 gallons of water per day. The chimney is 5 feet in diameter at its smallest point (the top), 125 feet high, and is built of radial brick. There are two independent jet condensers of Blake & Knowles manufacture, each of sufficient capacity to condense the steam from one compressor and one pump; two Henry R. Worthington boiler feed pumps, each capable of supplying either boiler, and one feed water heater designed to use the exhaust from the condenser pump and boiler feed pump for heating the feed water from 190 degrees to 210 degrees F. The entire plant has capacity to pump in eight hours all of the water at present required for one average day's use.

The reservoir has a capacity of 2,000,000 gallons,* or five times the present average daily consumption. This reservoir is in the shape of a truncated triangle 255 feet long, 90 feet wide at one end and 20 feet wide at the other, and 23 feet 9 inches deep, this shape being given to conform it to the topography of the land. It is divided into two sections, either of which can be emptied for cleaning. When full it gives a static pressure of 117 pounds at the village hall. It is possible that houses will before long be built at an elevation too great to be supplied by gravity from the reservoir, in which case it is proposed to erect a small standpipe on top of the mountain somewhat higher than the reservoir and fill this from the reservoir by an electric pump operated from the power house.

The reservoir was made by excavating into the rock on the mountain side and lining the sides and bottom of the excavation with reinforced concrete, the same material being also used for covering the roof; this roof being supported by steel columns surrounded with concrete. The reservoir is connected with the pumping station by electric wires for telephone, lighting and



INTERIOR OF RESERVOIR, SHOWING CONCRETE-ENCASED STEEL COLUMNS.

*In our issue of December 11, page 800, this was incorrectly given as 50,000,000 gallons.

power which are carried in a conduit which was laid on top of the pumping main.

The pumping station also contains a dynamo for lighting the building and grounds, and the plans provide for a storage battery to be used for this purpose when the boilers are shut down, also for an air tank and fire whistle for sounding fire alarms. The pumping station is a brick building on reinforced concrete foundation, with tile roof and with the walls lined with cement and wainscoted in the engine room to a height of 8 feet with white glazed brick. A siding from the railroad brings coal cars directly to the coal pockets at the side of the boiler room.

About one-third of the floor space of the pumping station is left vacant to permit installing an electric plant for lighting the streets when this may be considered advisable.

WATER WORKS STATISTICS.

The tables following give data concerning water works plants and management which have been received since the publication of the larger similar tables in our issue of July 3. From all the reports received (about 400 in number) we have calculated further data, such as water consumption per capita, cost of plant per million gallons, etc., which we will probably publish in January.

TABLE NO. 1.—GENERAL AND FINANCIAL DATA. MUNICIPAL PLANTS.

Name of City	Population		Consumption, Gallons			Cost of Maintenance					Cost of plant to date	Out-standing bonds
	Total	Supplied	Total	Through meters	Maximum daily	Street work	Pump-ing Station	Purifi-cation Plant	Supt., office and all other			
Arizona:												
Phoenix	18,000	18,000	950,856,000	7,000,000	3,500,000	\$23,251.84a	.....	.....	.....	\$442,432.23	\$300,000
Colorado:												
Greeley	9,000	12,000	.....	.....	.....	.....	.....	.....	.....	500,000.00	385,000
Florida:												
Jacksonville..	80,000	56,000	1,963,246,278	1,560,388,141	6,341,100	.....	.....	.....	.....	.....	.....
Georgia:												
Douglas	6,000	4,000	20,000,000	15,000,000	70,000	2,000.00	\$4,000.00	.....	.....	75,000.00	126,000
Macon	45,000	37,000	1,767,973,680	.....	6,200,000	15,252.84	44,027.58b	.....	19,841.44	900,000.00	900,000
Illinois:												
Mattoon	14,000	6,000	260,000,000	182,000,000	600,000	.....	4,800.00	.....	1,300.00	130,000.00c	.....
Springfield ...	54,678	26,000	1,919,623,041	929,498,441	9,000,000	2,580.00	46,665.00	.....	118,495.97	1,803,824.00	.....
Spring Valley..	7,035	4,500	150,000,000	300,000	460,000	5,500.00	4,500.00	.....	600	.....	.....
Kansas:												
Coffeyville ...	15,000	15,000	832,860,000	192,418,000	4,000,000	10,566.50	.....	.....	.....	266,227.41	35,000
Ottawa	7,650	4,000	275,000,000	96,250,000	1,200,000	11,050.00a	.....	.....	.....	130,000g	130,000
Kentucky:												
Newport	34,000	46,000	998,110,136	322,353,555	3,200,000	2,869.00	16,803.32	3,000.00	21,451.00	\$41,000.00	683,000	
Louisiana:												
Alexandria....	16,000	12,800	182,000,000	d	500,000	.....	.....	.....	.....	.....	.....
Maine:												
Augusta...	16,160,000	11,716	769,980,000	23,851,500	2,103,770	14,241.61a	.....	.....	.....	783,063.06	700,000 e
Maryland:												
Baltimore.....	569,000	569,000	26,738,658,608	6,348,315,317	79,930,432	.....	.....	25,000.00	.....	15,307,686.57	10,100,000
Massachusetts:												
Wellesley.....	7,760	7,700	136,920,000	90,515,000	.....	5,895.00	4,551.00	.....	.....	416,457.00	291,000
Minnesota:												
St. Paul.....	222,700	190,000	4,806,629,259	2,151,331,455	.....	8,360.72	36,110.18	.....	65,295.22	5,658,499.79	1,844,000
New Jersey:												
Bridgeton.....	15,000	12,000	507,800,000	.....	1,600,000	436.35	6,388.82	.....	2,341.50	347,382.50	130,000
Dover	9,000	8,000	95,000,000	60,000,000	500,000	3,000.00	2,000.00	.....	2,000.00	200,000.00	196,000
New York State:												
Albany.....	101,469	101,469	9,061,480,000	3,030,493,000	24,552,000	31,797.97	63,059.75	47,082.95	306,822.19	2,741,600.00	1,521,300	
Corning	15,000	14,600	467,165,000	.....	1,280,000	2,207.06	7,044.79	.....	3,109.34	.....	155,000
New York City:												
Bor. Bronx.. }	.....	.....	303,000,000	.....	.....	.....	.....	.....	.....	.....	.....
Bor. Mhnt'n. }	2,912,200	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Watertown ...	28,000	25,000	1,847,464,000	.....	6,000,000	.....	2,804.18	15,367.11	.....	800,000.00	286,000
Ohio:												
New Philadelphia	9,500	9,200	298,000,000	.....	1,250,000	721.39	4,306.59	.....	2,448.90	134,500.00	127,000
Urbana	7,000	5,000	300,000,000	6,000,000	1,000,000	1,626.75	8,363.73	.....	1,448.97	130,000.00	125,000
Oklahoma:												
Lawton	10,000	10,000	.....	.....	.....	.....	.....	.....	1,200.00	477,649.19h	440,000
McAlester	15,000	15,000	250,000,000	183,000,000	1,000,000	1,500.00	25,000.00	.....	2,200.00	.....	325,000f
Rhode Island:												
Providence....	235,600	260,600	6,463,472,693	4,524,430,885	25,337,350	.....	41,475.11	27,847.83	.....	7,725,653.08	3,846,000
South Dakota:												
Sioux Falls...	17,000	.....	400,810,255	.....	1,097,562	.....	.....	.....	18,251.15	473,585.61	310,000
Texas:												
Austin	35,000	.....	1,126,000,000	800,000,000	5,000,000	15,632.23	18,740.12	.....	28,479.63	899,529.29	.....
El Paso.....	50,000	55,000	1,460,000,000	.....	3,890,000	117,650.00	85,600.00	.....	.....	1,365,920.00	477,000
Marshall	12,000	.....	1,825,000,000	.....	600,000	.....	.....	.....	18,272.68	200,000.00	140,000
Vermont:												
Barre	12,000	10,000	547,500,000	.....	1,500,000	.....	.....	.....	14,733.50	329,532.00	230,000
Wisconsin:												
Sparta	4,000	2,000	140,466,000	93,779,396	1,038,350	91.17	181.26	.....	.....	89,000.83	25,000

a—Includes all maintenance cost.
b—Includes purification plant.
c—Includes reservoirs.
d—All except fire and flush tanks.

e—Sinking fund of \$66,114.04.
f—Water and sewer expenses combined.
g—Allowance made for depreciation.
h—Approximate.

TABLE NO. 2.—GENERAL AND FINANCIAL DATA. PRIVATELY OWNED PLANTS.

Name of City.	Population.		Consumption, Gallons.			Cost of Maintenance.					Out-standing bonds.
	Total.	Supplied.	Total.	Through meters.	Maximum daily.	Street work.	Pump-ing station.	Purifi-cation plant.	Sup't. office and all other.	Cost of plant to date.	
California:											
San Francisco...	450,000	450,000	14,319,742,919	.....	48,000,000	68,000.00	138,000.00	.....	573,521.00	.....	18,000,000
Illinois:											
Mattoon	14,000	6,000	140,000,000	.....	1,000,000	700.00	6,000.00	.....	3,000.00	150,000.00	125,000
Iowa:											
Burlington	24,324	21,891	761,847,059	173,028,046	3,984,480	6,587.84	14,333.03	5,808.06	6,934.99	654,500.00	188,000
Creston	7,000	3,677	218,062,070	.....	697,000	.....	6,646.05	1,528.42	7,817.32	.....	.....
Seneca Falls ...	6,500	5,000	275,000,000	2,000,000	.....	.....	.....	.....	.....	.....	.....
Ohio:											
Massillon	15,000	14,700	329,456,570	87,545,539	1,289,850	.....	.....	.....	.....	.....	200,000
Pennsylvania:											
Shamokin	35,000	33,000	1,500,000,000	.....	5,000,000	.....	.....	.....	.....	1,200,000.00	400,000
Washington ...	21,000	10,000	.....	312,604,500	.....	2,841.57	9,276.86a	.....	.....	1,158,332.68	700,000
Virginia:											
Newport News, Hampton and Phoebus	50,000	40,000	916,203,733	.....	3,500,000	672.42	12,507.35	4,203.17	96,705.95	2,007,180.03	964,000
Washington:											
Everett	24,832	25,000	1,007,608,480	320,163,779	4,000,000	.....	.....	.....	.....	.....	.....
Wisconsin:											
Superior	40,384	36,000	508,368,800	291,168,800	2,840,000	.....	15,088.16	1,342.88	.....	1,618,178.19	1,064,000

a—Includes all operating expenses except street work.

TABLE NO. 3.—DISTRIBUTION SYSTEM DATA. MUNICIPAL PLANTS.

Name of City.	Street Mains		Discon-tinued during year, length, feet.	Now in service, length, miles.	Hy-drants now in service.	Appli-ances for filling water-ing carts.	Stop gates.	Service connections.		Meters.		Motors and elevators supplied.	Pri-vate fire con-nections.
	Laid during year, feet.	Kinds.						Added during year.	Now in service.	Added during year.	Now in service.		
Arizona:													
Phoenix	26,000a	c. i.	0	75.0	200	70	...	520	3,850	50	250	...	1
Colorado:													
Greeley	2,500	steel	...	25.0	100	1	94	25	1,955	6	85	6	4
Florida:													
Jacksonville	7,212	c. i.	...	58.17	703	..	566	911	9,270	956	7,368	...	...
Georgia:													
Douglas	2,000	c. i.	...	6.0	16	..	12	25	400	10	285	...	...
Macon	167,125	...	...	79.1	497	16	923	837	5,370	1,465	2,520	...	16
Illinois:													
Mattoon .....	.....	.....	.....	3.7	4	..	12	3	103	3	103	...	...
Springfield	10,293	.....	980	104.5	863	..	1,196	429	6,049	2,719	6,049	...	16
Spring Valley	2,400	c. i.	...	.....	53	3	...	55	940	4	26	...	...
Kansas:													
Coffeyville	28,482	c. i.	...	39.0	166	..	196	80	1,975	160	911	4	10
Ottawa	580	c. i.	...	16.6	128	3	70	78	1,000	85	385	...	...
Kentucky:													
Newport	600	...	...	40.0	260	..	952	160	6,297	221	2,260	7	4
Louisiana:													
Alexandria .....	.....	...	...	.....	126	3	...	46	...	46	1,237	...	9
Maine:													
Augusta	3,948	c. i. & w. i.	591	44.67	169	13	275	73	2,023	4	23	7	20
Maryland:													
Baltimore	68,711	c. i.	23,660	731.9	3,551	..	...	2,459	112,670	324	3,400	100	600
Massachusetts:													
Wellesley	9,680	c. i.	779	41.0	363	35	314	72	1,255	72	1,319	...	...
Minnesota:													
St. Paul	71,925	c. i.	...	363.95	3,293	484	3,041	1,573	33,129	2,774	19,584	...	163
New Jersey:													
Bridgeton	3,650	c. i.	...	32.1	318	..	465	103	2,978	...	...	12	63
Dover .....	.....	...	...	23.0	160	..	700	100	1,400	100	1,100	...	4
New York State:													
Albany	24,446	...	11,457	145.48	1,129	..	1,200	702	17,230	590	5,192	60	77
Corning	1,716	...	...	28.0	268	4	273	162	2,621	162	2,600	12	8
Watertown .....	.....	...	...	58.8	489	92	684	31	...	50	690	15	44
Ohio:													
New Philadelphia....	7,900a	...	...	15.0	54	3	30	85	1,750	125	262	4	20
Urbana	2,000	c. i.	...	22.0	165	..	110	50	1,448	12	65	...	5
Oklahoma:													
Lawton	2,600a	...	...	36.0	227	..	80	90	1,800	8	200	1	4
McAlester .....	.....	...	...	.....	167	..	...	200	2,100	36	1,600	...	20
Rhode Island:													
Providence .....	.....	c. i.	...	.....	...	67	4,527	895	29,413	...	26,298	215	521
South Dakota:													
Sioux Falls .....	.....	...	...	.....	227	..	...	264	2,893	430	2,605	...	...
Texas:													
Austin .....	.....	...	...	.....	...	..	...	367	4,850	367	4,850	...	...
El Paso	16,000	...	...	78.0	306	73	5,676	636	7,256	...	5,235	29	70
Marshall .....	.....	...	...	.....	180	7	...	...	850	...	700	...	12
Vermont:													
Barre	2,526	...	...	65.0	120	8	...	27	1,650	40	218	...	...
Wisconsin:													
Sparta	700	c. i.	...	12.9	78	..	48	25	434	48	410	1	3

a.—Approximate.

TABLE NO. 4.—DISTRIBUTION SYSTEM DATA. PRIVATELY OWNED PLANTS.

Name of city	Street Mains.				Hydrants now in service.	Appliances for filling watering carts.	Stop gates.	Service Connections.		Meters.		Motors & elevators supplied.	Private fire connections.
	Laid during year.		Discontinued during year, length, feet.	Now in year, service, length, miles.				Added during year.	Now in service.	Added during year.	Now in service.		
	Length, feet.	Kinds.											
California:													
San Francisco..	.....	.....	....	580	4,400	..	3,500	2,600	60,000	2,129	17,930	..	..
Illinois:													
Mattoon	10,000a	.....	....	17.3	168	..	25	97	910	75	610	..	3
Iowa:													
Burlington ...	10,566	c.i.	137	46.96	474	4	555	211	4,184	....	200	16	20
Creston .....	.....	.....	....	12.0	142	..	...	...	677	60	481	..	..
Seneca Falls..	1,000	c.i. & wi.	....	22.0	138	6	133	102	1,600	4	64	..	11
Ohio:													
Massillon	3,067	.....	....	30.11	309	3	224	60	5,266	75	920	2b	2
Pennsylvania:													
Shamokin	3,622	.....	....	58.83	125	..	391	106	3,000	....	65	1	..
Washington ..	4,375	.....	....	50.79	215	..	172	226	3,016	180	3,016	c	4
Virginia:													
Newport News, Hampton and Phoebus	16,194	.....	....	89.72	206	..	468	157	4,875	96	2,828	2	9
Washington:													
Everett .....	.....	woodpipe- Matheson	....	83.75	171	..	....	178	5,117	....	264	10b	..
Wisconsin:													
Superior	8,156	c.i.	...	58.5	746	..	349	401	4,780	667	4,026	..	26
a—Approximate. b—Elevators only. c—Motors and elevators metered.													

a—Approximate. b—Elevators only. c—Motors and elevators metered.

GRAND RAPIDS WATER AND LIGHT.

The city of Grand Rapids, Michigan, according to a recent annual report, had 8,721 water meters in service, of which 7,961 were $\frac{5}{8}$ -inch meters, 379 were $\frac{3}{4}$ -inch meters, 222 were 1-inch meters and the remainder were small numbers of various sizes up to 6-inch. The average cost of maintenance of the $\frac{5}{8}$ -inch meters during the year in question was 17 cents. The records give this in terms of the average cost for each make of meter, and these vary from 5 cents for each of two of the sixteen makes to 37 cents for one of them. The average cost of maintaining $\frac{3}{4}$ -inch meters was about 20 cents, varying from 11 cents to 28 cents; and the average for the 1-inch meters was about 20 cents, varying from 15 cents to 25 cents.

Of the 7,961 $\frac{5}{8}$ -inch meters, 1,926 were repaired at a total cost of \$1,188.74, an average of 61 cents each. Of the 379 $\frac{3}{4}$ -inch meters, 107 were repaired at an average cost of 72 cents. Of the 222 1-inch meters, 31 were repaired at an average cost of \$1.64. The average cost of repairing 7 $1\frac{1}{2}$ -inch meters was \$1.32; of repairing 37 2-inch meters was \$2.47, and repairs to a 4-inch meter cost \$1.

Forty-four per cent of the services are metered and 46 per cent of the consumption.

The total cost of construction of the municipal lighting plant of Grand Rapids, Mich., to the end of the fiscal year was \$253,393, and \$127,738 was charged off for depreciation and removed and abandoned machinery, leaving a present value of \$125,655. Of this total the engines are estimated at \$12,320; crane, \$1,084; electric equipment, \$25,331; towers, \$5,736; lines and cables, \$79,464, and line supplies, \$1,721. The outstanding bonds consist of \$125,000 4 per cent twenty-year bonds issued in 1897. The expenditures during the year were \$63,082, of which \$26,150 was for station expenses, \$8,226 for distribution, and \$404 for office, while \$28,302 was for construction. Of the station expenses, coal comprised \$15,874, and the pay of the superintendent engineers and other wages comprised most of the rest.

The average cost of operating the plant, station expenses only, were as follows, figures given being cents per k. w. h.: Coal, .9226; wages, .4902; repairs, .0495; supplies, .0395; oils, .0172; total, 1.519 cents per k. w. h.

The total expenses per k. w. h. were the same for coal and oils, and included .2679 additional for wages, .0634 for carbons, .0691 for globes, .0410 for repairs, .0445 for supplies. The total average cost was 2.0049 cents per k. w. h., or 1.0591 cents per lamp hour. The average cost per lamp per day was 10.747 cents. The average number of lamps operated per day was 877, with an average number of outages reported of 7. The lamps were operated on an average of 10 hours and 32 minutes per day. The average cost per lamp per year computed on the above basis was \$39.32; the average cost per lamp-hour, operation only, .8149 cents, and the cost per lamp-hour, distribution only, .2442 cents. The overhead charges were reported to be the following amounts per lamp per year: Depreciation, \$5.39; interest on bonded debt, \$5.71; interest on investment over bonded debt, \$5.86; loss through non-taxation, \$2.25; a total cost, including overhead charges, of \$58.54 per lamp per year. The average number of kilowatt hours per day was 4,701, or about .53 kilowatts per lamp. There were repaired during the year 347 A. B. lamps, iron case; 77 A. B., copper case; 43 Fort Wayne D. C., and the remainder Fort Wayne A. C., Fort Wayne magnetite, G. E. magnetite and Westinghouse magnetite. The numbers in service (in the same order as just named) were 462, 247, 109, 50, 7, 6 and 6, respectively. The average cost for repairs varied from 29 cents to \$3.40 per lamp of different kinds, averaging \$1.30 for all lamps.

SEPTIC TANK PATENTS.

The Editor, Municipal Journal,
50 Union Square, New York, N. Y.

Sir: In several of the Engineering Journals a letter has recently appeared under the heading, "Patents on Springfield Sewage Disposal Details," signed by the Sterilization Company, Newark, N. J., in which the statement is made that the Cameron Septic process patent is controlled by that Company.

The statement is not true, and as the Sterilization Company, ignoring our written request to retract it, has failed to do so, we ask that you publish this letter as notice to your readers that the statement referred to is entirely unwarranted, and further, that the ownership and control of the Cameron Septic process patent is vested in the undersigned.

H. D. WYLLIE,
Manager, Cameron Septic Tank Company.

Municipal Journal

Published Weekly at
50 Union Square (Fourth Ave. and 17th St.), New York
By Municipal Journal and Engineer, Inc.
Telephone, 2805 Stuyvesant, New York
Western Office, 72 W. Adams Street, Chicago

S. W. HUME, President
J. T. MORRIS, Treas. and Mgr. A. PRESCOTT FOLWELL, Secretary
C. A. DICKENS, Western Manager
A. PRESCOTT FOLWELL, Editor
F. E. PUFFER, Assistant Editor

Subscription Rates
United States and possessions, Mexico, Cuba.....\$3.00 per year
All other countries..... 4.00 per year
Entered as second-class matter, January 3, 1906, at the Post Office at New York, N. Y., under the Act of Congress of March 3, 1879.

CHANGE OF ADDRESS

Subscribers are requested to notify us of changes of address, giving both old and new addresses.

Contributions suitable for this paper either in the form of special articles or of letters discussing municipal matters, are invited and paid for.

Subscribers desiring information concerning municipal matters are requested to call upon MUNICIPAL JOURNAL, which has unusual facilities for furnishing the same, and will do so gladly and without cost.

DECEMBER 25, 1913.

CONTENTS

Cleaning Water Mains at Hartford. (Illustrated.) By C. M. Saville	853
Combining Municipal Water Systems.....	856
Broad Street Lighting System. (Illustrated.).....	857
Long Illuminated Boulevard. (Illustrated.) By Albert Marple	858
South Orange Water Works. (Illustrated.).....	858
Water Work Statistics: Tables.....	860
Grand Rapids Water Works Notes.....	862
Septic Tank Patents	862
The Municipal Bond Market.....	863
Too Intense Street Lighting.....	863
City Manager for Dayton	863
Any Voter Can Fill Any City Office.....	863
Joint Use of Poles.....	864
Water Rates in New Orleans.....	864
Municipal News. (Illustrated.).....	865
Legal News—Notes of Recent Decisions.....	871
News of the Societies	872
Personals	873
New Appliances. (Illustrated.).....	874
Industrial News	876
Contract News	877

The Municipal Bond Market.

Indications are that from now on, until certain conditions change, municipalities will have no difficulty in disposing at good terms of any reasonable amounts of bonds where the city's finances are in good condition. It was to be anticipated that this would be the case for two or three reasons. One is the governmental discouragement of investments in railroads (some of the favorite railroad securities have depreciated from 25 to 75 per cent during the past year); another, the possibility that there will come into more general practice the approach to the single tax on real estate which has been introduced in a number of cities. This causes investors to look about for some other favorable security, and municipal bonds seem to be safe, if not particularly remunerative. Another act of the Federal Government has added to the attractiveness of municipal bonds, in that the income tax law provides that incomes from state and municipal bonds are exempt from tax and no declarations are required with respect to interest or coupons therefrom.

That these acts of the Federal Government have resulted in driving capital from other investments and attracting it to municipal bonds has been very evident during the past three months. For instance, Baltimore's bonds have advanced in value nearly 5 per cent since June, New York City's bonds about 4 per cent. The

dealers in municipal bonds are rapidly selling out their stock, and the first few months of 1914 will probably see a demand for municipal bonds such as has not been experienced for several years. It looks as though February and March will be unusually favorable times for municipalities to raise funds in this way.

Too Intense Street Lighting.

In the matter of display lighting of business districts there has been during the past few years a rivalry not only between streets in the same city, but between cities themselves which, as might be expected, has resulted in lighting systems in some cases which were not only unnecessarily expensive but were actually undesirably intense. An instance of this kind is referred to on another page of this issue. Newark, N. J., had adopted a lighting system for its business centre which not only was unremuneratively expensive to the merchants, but which was objected to as being too brilliant for comfort, and that system is now being replaced by lights which, while less intense, give a more uniform and sufficiently brilliant illumination at a much lower cost. Common sense should be used in this matter as in others, and the aim in the illumination of a business district should be to obtain the intensity and distribution of illumination which is most pleasing to prospective purchasers, and not the most intense light possible. The latter may attract attention and crowds for a few days, but after that we do not believe it results in attracting any more business than would a lighting system designed to serve the purpose of good illumination rather than of mere display.

City Manager for Dayton.

Dayton, Ohio, is, we believe, by far the largest city which has yet adopted the city manager plan of government, and its experience will be watched with a great deal of interest. The city commission realized the importance of the selection of the manager and has spent a number of months in searching for the right man. Col. Goethals, chief engineer of the Panama Canal, was asked to take the position but declined after careful consideration. Selection has been made of the city engineer of Cincinnati, H. M. Waite, who will assume the office of city manager of Dayton on January 1 next.

One encouraging sign is that the city of Dayton apparently appreciates the importance of the position, and has fixed the salary at \$12,500, which is more nearly commensurate with the responsibilities and qualifications desired in a city manager than is generally found in the salaries attached to any of the offices through which our city governments are operated.

Any Voter Can Fill Any City Office.

A Pennsylvania city of about 30,000 population has recently adopted an ordinance distributing the executive and administrative powers of the government, which contains several allotments which, while it is easy to understand how they could have arisen in the gradual development of a city government, there is in our opinion no excuse for embodying in any new form of government. Two of these in particular seem to be worthy of comment, one providing that "The councilmen and the mayor shall constitute the Board of Health, performing the duties pertaining thereto, and the mayor shall be the president thereof."

The other provides that the superintendent of the Department of Accounts and Finance, in addition to having supervision of the accounts and records of the city shall also "have charge of the department of garbage, of the garbage plant, its equipment, operation, mainte-

nance and repairs, and of all the employees thereof." There is a superintendent of streets and public improvements who has charge not only of the construction of street improvements and sewers, but also of the cleaning of streets and "all other public work not otherwise assigned." Garbage collection and incineration is closely connected with the street cleaning, and the official who is in charge of the latter class of work would be especially well qualified to operate the department of garbage. We can not imagine what qualifications the business expert who should be placed at the head of the department of accounts and finance could possibly have for operating the department of garbage; and we cannot conceive of any reason or excuse for placing in his hands this work which, even more than the street cleaning, requires the close oversight of a man familiar with the employment and supervision of labor and teams, and with the mechanical and other features involved in operating an incinerating plant. The superintendent of public safety, chief of the fire department, city engineer, or even superintendent of parks, would any one of them have been a more suitable official to place in charge of the garbage department.

As to making the council act as a Board of Health, the objections to this were discussed in our synopsis of a report on the Board of Health of Atlanta, Ga., which appeared in our December 18 issue. Too many of our cities still make municipal appointments on the theory that any voter (of the right party) with a fair amount of common sense is competent to manage any city department or public utility, which furnishes a considerable part of the explanation why municipal ownership so often falls far short of the desirable efficiency.

JOINT USE OF POLES.

The unsightliness and wastefulness of the vast number of poles which appear on the streets of many of our cities, in some cases three or four sets of poles belonging to as many different companies lining the same street, is one which has received the consideration of city officials everywhere. The most drastic and conclusive manner of solving the method is to order all of the wires underground; but this is not always practicable, and the next best alternative would appear to be a co-operation of the several companies involved by which all may use the same set of poles and thus reduce the number by 50 or 75 per cent.

At the October meeting of the American Electric Railway Association a report was presented by a committee on the joint use of poles, which committee also contained representatives of the National Electric Light Association, American Institute of Electrical Engineers and the American Telegraph & Telephone Company. The report of the committee was laid over for final action at another meeting which will be held in a short time, when it is probable that this or a modified system will be adopted, so far as this society is concerned. It is to be hoped that some such agreement will be generally adopted by all the companies of the country which string wires in city streets. The city is, of course, interested in the matter purely from the point of view of reducing street obstructions, whereas the companies are chiefly interested in the matter as an economical measure; and while in the majority of cases little difficulty is experienced by cities in compelling such joint use it would be better for all concerned should the initiative be taken by the companies themselves and under standard regulations to which they have all agreed.

The report of the committee provides for a form of agreement to be signed by all the companies making joint use of a pole or poles and a set of specifications cover-

ing in detail the methods for using the poles. The former recognizes one party as owner of a pole and another or other parties as licensees, and provides that any party meeting certain requirements may, upon making written application to an owner, demand permission to place attachments upon the poles of the latter under the conditions of the agreement and specifications. If the pole is not of sufficient size or strength to contain all of the wires, it is to be replaced and the cost of replacing be distributed "in such proportions as is equitable and fair." Divisions of expense in this and other cases are to be agreed upon by the parties, if possible; but arrangement is made for arbitration of this and all other questions, each of the parties appointing one arbitrator and these arbitrators appointing one or two additional arbitrators, whichever is necessary to give an odd number of members on the arbitration board. Standard rentals are provided, the unit being the charge for attachment to each individual pole, a separate price being fixed for each attachment, such as wires up to and including No. 0000 B. & S. gauge, wires larger than this, arc lamps, incandescent lamps, transformers, trolley span wires, switches, signalling wires, cables of 26 pairs or less, cables of more than 26 pairs, etc. No rental is to be charged for cross arms to support wires or cables, guys, ground wires, etc. Each company is to make a report each year of the number of wires upon each pole, and every third year a joint inspection of the poles shall be made by the parties to the agreement to check up these annual reports.

The committee has endeavored to cover all contingencies and details, such as the removal and change of attachments, abandonment of poles, maintenance of poles, maintenance of attachments, collection of payments, liabilities for damages, etc. The specifications cover the points of vertical spacing and position of attachments, minimum sizes of line wires, maximum length of span, lateral wires, vertical wires, transformers, cable boxes, lamp fixtures, guys, etc.

WATER RATES IN NEW ORLEANS.

In our issues of July 14, 1911, and May 23, 1912, we published at some length descriptions of the scheme employed by the Sewerage and Water Board of New Orleans for regulating its water rates, this being based upon a service charge which varied with the size of meter, and a meter rate which was constant.

By the end of the year 1912 the board learned that the returns from the rates which it was then charging were in excess of the amount required to operate and maintain the water works in all its departments and to allow the board to set aside a liberal sinking fund and an accident damage fund to meet any claims which might be made against the board. The officers of the collection department and general superintendent George G. Earl were therefore directed to prepare new rates which would make the revenue more nearly conform to the requirements of the board. The new rates make a reduction of approximately 25 per cent in the service charges, these now varying from 75 cents per quarter for a 5/8-inch meter and 90 cents for a 3/4-inch meter up to \$18 for an 8-inch meter. It is estimated that this reduction will decrease the amount collected by about \$40,000 a year, and that more than half of the consumers will pay less than \$1.50 per quarter, while possibly one-quarter will pay from \$1.50 to \$2 per quarter. In addition to the service charge there is charged for the water used (after the deduction of free water for sanitary purposes, as required by law) 10 cents per thousand gallons up to 100,000 gallons per month, and 7 cents per thousand gallons for all in excess of 100,000 gallons per month.

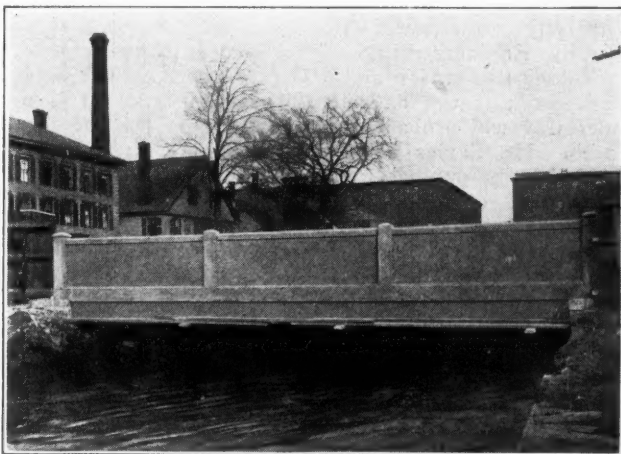
The WEEK'S NEWS

Concrete Bridge in Lowell—Year's Highway Work in Virginia—Cities Build Sidewalks—Sewer Construction in Watertown, N. Y.—Sacramento Seeks Mountain Water Supply—Montana's Municipal Works—Light Rate Reductions—Limit Speed of Fire Autos—Regulate Width of Vehicles—Chicago Solving Problem of Employed.

ROADS AND PAVEMENTS

Concrete Bridge in Lowell, Mass.

Lowell, Mass.—The new reinforced concrete bridge across the western canal in Moody street has been opened to traffic. This bridge is built entirely of concrete and steel and along the line of permanent construction. About all of the new bridges in Lowell have iron fences, but the bridge in Moody street has a concrete balustrade instead. The bridge



Courtesy Lowell Sun.

CONCRETE CANAL BRIDGE.

is about 50 feet wide and 37 feet long. The pavement is a 4-inch concrete wearing surface, reinforced with wire mesh, with reinforced granolithic sidewalks. The approximate cost of the bridge was \$2,000, which is the cheapest permanent bridge ever built for the city. The bridge was built, in its entirety, by the city.

Many Miles of Road Built in Virginia.

Richmond, Va.—Highway Commissioner Wilson has filed his annual report for his department with Governor Mann. It shows that 619 miles of road were built under the direction of the department this year, this being separate from the roads built by the counties on the bond issue plan. Captain Wilson says that the best results are to be obtained by working the convicts on the roads at all times. The report shows that there is a total of 1,500 men on the roads at this time, nearly 400 of whom are convicts. Seventy-five bridges have been built under the direction of the department and there are plans for an equal number now ready for submission to contractors. This year thirteen counties have voted a total of \$1,306,000 for building roads, while in seven years thirty-two counties have voted \$6,324,000 for the same purpose.

To Demonstrate Value of Highway Maintenance.

Washington, D. C.—In order to demonstrate the value of practical maintenance of highways, the American Highway Association has arranged in co-operation with the Federal Office of Public Roads, and road officials in Virginia, North and South Carolina and Georgia for a maintenance experiment on the road from Washington to Atlanta, Ga. Over 700 miles of road are expected to be improved and kept in condition as a result of the initiative of the American Highway Association. The experiment is on a larger scale than any maintenance experiment ever undertaken in this country. The American Highway Association will enlist the support

of the counties and districts traversed by the road, and wherever possible will induce the local authorities to place the road under the supervision of government engineers, who will be detailed from the Office of Public Road for that purpose under the co-operative arrangement. Probably 75 per cent. of the total mileage has already been improved by a surfacing stone, gravel or a mixture of sand and clay. The object of the maintenance scheme is to prevent the improved portions of the road from deteriorating for lack of suitable care, and to make the unimproved portions as comfortable for travel as possible with the money available. Leonard Tufts is chairman of the committee designated by the association to have charge of the campaign and he has already arranged to place 110 miles under government engineers.

Atlanta Surpasses Own Highway Record.

Atlanta, Ga.—Street work done this year by the city of Atlanta is over five times greater, in number of miles, than the work in 1909; nearly twice as great as the work in 1910, which was the best year previous to 1913; and is nearly one-seventh greater than the work done in 1911 and 1912 combined—according to figures given out by Councilman Orville H. Hall, chairman of the Street Committee of the General Council. The number of miles paved and the value of each year's work for the last five years compare as follows:

Year.	Miles.	Value.
1909.....	3.05	\$19,878
1910.....	9.3	197,030
1911.....	7.16	83,572
1912.....	8.11	102,186
1913.....	17.98	364,237

These figures represent the city's part, the property owners' part and the street car company's part of the cost of the pavement. The 1913 street committee has followed what it believed to be a progressive policy in testing out various kinds of new street paving materials.

Oppose Federal Road Fund.

Philadelphia, Pa.—Federal aid for highways throughout the United States, unless planned upon some comprehensive system, was not favored by those who recently addressed the tenth annual convention of the American Roadbuilders' Association. Several of the speakers said that the bills now before Congress providing for Federal aid for good roads were designed more to stimulate graft than to give the States good, permanent highways. S. P. Hooker, State Superintendent of Highways of New Hampshire, said he did not favor Federal aid under present proposed schemes. If Federal aid was to be given, he added, there should be a Federal Department of Roads, and each State should have a similar department. In outlining his plan Mr. Hooker said each State should prepare its own maps and make assessed valuations, and should inform the Federal Government the amount of State funds available for road building, and that Federal aid should be based upon this information.

City Constructs Sidewalks

Flint, Mich.—With the outdoor work of the city engineer's department nearing its close, it has been possible to compile from the figures showing the year's work a report that indicates the city's great activity in sidewalk construction.

The report shows that there have been 132,620 square feet of cement walk built this year, including crosswalks, or practically three times as much as was laid last year as shown by the annual report of the city engineer made last spring. The total number of square feet of sidewalks, including crosswalks laid last year, was 58,522.

One reason for the great increase in the amount of walk constructed is the fact that persons living in the outskirts of the city have succeeded in getting walks laid.

It is the opinion of City Engineer Shoecraft that there will be more of this kind of work done during the coming year and there is a probability, it is said, that within a year or two all the persons residing in the outskirts will have the convenience of walks.

Ask Concrete Base for Railway Ties.

Baltimore, Md.—To permit the laying of sheet asphalt within the railway area, as well as on the roadway of those streets where that material is to be used, the Paving Commission is endeavoring to persuade the United Railways to reinforce its ties on such streets with concrete. At the present time all of the ties of the United Railways are laid on ballast bases, which causes such vibration when heavy cars pass over them that, according to Chairman Compton and engineers of the Paving Commission, were sheet asphalt laid in the railway area it would crack in a very short time. This has been the reason for the decision of the Paving Commission to lay Belgian blocks within the railway area on that portion of Baltimore street to be repaved—a decision that will be adhered to unless the United should decide to lay a concrete base beneath the ties on that street before repaving work is started.

City Increases Sidewalks.

Williamsport, Pa.—All former records for sidewalk construction in the city have been eclipsed this year. Over 2½ miles have been built, some in every portion of the city. A number have been constructed under the direction of H. M. Ephlin, city sidewalk inspector. Every walk built within the fire districts has been constructed either of stone or concrete and outside of these districts a majority of the walks were constructed of the same materials. Street Commissioner W. Marsh and his crew of men put down 112 concrete crossings in 1913. These crossings are distributed among the thirteen wards of the city.

Extensive Brick Paving.

St. Petersburg, Fla.—What is said to be the largest single contract for brick paving ever let in South Florida has been ordered by the commissioners at their recent meeting. This strip of paving will extend from Tampa Bay to Boca Ceiga Bay, a distance of six miles. A pavement 18 feet in width will be laid on each side of the trolley tracks, which will equal a strip of paving 12 miles in length. This bit of paving is to be secured through the public spiritedness of property owners along the avenue, who have agreed to see that all of the certificates issued against the property are sold. The brick will be of the best quality, laid flat, and the curbing will be of granite.

To Use Limestone Rock.

St. Petersburg, Fla.—Fifteen miles of road, in the first and second commissioners' districts of Pinellas county, will be covered with hard limestone rock brought from the Ocala district. It is estimated that 40,000 tons will be needed to finish this work. The commissioners ordered this material after careful consideration had been given, believing that the Ocala limestone will be satisfactory.

To Hold Fifty Highway Conventions.

Des Moines, Ia.—Fifty highway conventions in fifty Iowa counties as a part of the winter program will have some effect on the educational uplift of the state in the direction of better roads. Preparations are being made now to equip a corps of competent persons to direct these county meetings. The people most interested will be invited to a general meeting. There will be a forenoon program related to the elucidation of the new Iowa highway law, and an afternoon program on practical work under the law; then in the evening something more general. Pictures will be shown of work actually being done for better roads under the new law.

Prohibit Heavy Trucking on Asphalt Streets.

Jersey City, N. J.—An ordinance to protect asphalt streets from demolition by heavy trucks has been introduced by Commissioner Ferris and passed by the Board of Commissioners. It is to accommodate the heavy trucks that Commissioner Ferris is having the main thoroughfares in the city paved with granite blocks on concrete foundations. The enforcement of the new ordinance, it is said, will save the city thousands of dollars a year in the matter of repairs.

Semaphore Signal for Chicago.

Chicago, Ill.—Experimental tests have been made in Chicago of a semaphore signal for the control of street traffic at the crossings. The semaphore is operated by the policeman on duty at the crossing and it can be seen fully a block away.

SEWERAGE AND SANITATION

Sewer Work in Watertown N. Y.

Watertown, N. Y.—There are 46.2 miles of sewer within the city at the present time, according to totals secured by City Engineer Earle W. Sayles in figuring up the work done this season and in previous years. The present year's work is not entirely finished but all that is now under way will probably be completed by the end of the month. Mr. Sayles believes that by the expenditure of \$5,000 for its purchase and maintenance the city could secure a sewer cleaning machine which would result in fixing up some of the old sewers in the city and cause a big saving. There are in use in the city at the present time some sewers that are close to a half century old. These sewers have never been cleaned and owing to their condition from long usage must sooner or later cause trouble and damage which will result in expense to the city. For \$2,000 a cleaning machine could be purchased and \$3,000 appropriated would be sufficient to permit of putting three men at work with this machine, and keeping them at work during the season. The city has during the past four years and a half spent approximately \$165,000 in the construction of trunk sewers.

City Constructs Sewer.

Douglas, Ariz.—The experiment of constructing a sewer for itself, without the intermediary contractor has been begun in Douglas. City Engineer J. P. Sexton has put a force of four men to work trenching. The sewer will extend about 1,400 feet in all, and will occupy about two weeks, if material arrives promptly at hand. Mr. Sexton will make no estimate of probable cost, but it is believed by the council that it can be completed for less than \$1,000.

Smallpox in Manistique, Mich.

Manistique, Mich.—On account of sixty cases of smallpox in town the board of health has closed every theatre, club, church, and other meeting place for sixteen days. About 90 per cent of the population has been vaccinated.

WATER SUPPLY

Investigate Possible Sources of Water Supply.

Sacramento, Cal.—It was decided by the City Commission to begin an investigation of possible sources of mountain water supply beginning January 1st. The work will be in charge of City Engineer Albert Givan. The investigation will be of a preliminary nature and will occupy three months. The cost is limited to \$2,400. Three men will be employed to analyze the waters of the middle and south tributaries of the American River, the middle and south tributaries of the Cosumnes River and the Mokelumne River. Gauge measurements also will be made. The total cost of the investigation is expected to reach \$10,000.

Municipal Works in Montana.

Helena, Mont.—If municipally owned water works systems still be an experiment in Montana, the experiment is being tried out on quite an extensive scale. Fifty-three cities, towns and villages in Montana have water works sys-

tems, according to the records of the State Public Service Commission, and twenty-four are municipally owned. These places are: Big Timber, Bozeman, Chester, Chinook, Conrad, Dillon, Eureka, Forsyth, Fort Benton, Glendive, Great Falls, Harlem, Harlowton, Havre, Helena, Kalispell, Lewistown, Manhattan, Miles City, Moore, Philipsburg, Red Lodge, Townsend and Whitefish.

Hetch-Hetchy Bill Signed.

Washington, D. C.—The bill giving the city of San Francisco the right to secure its water supply from Hetch-Hetchy Valley, in Yosemite National Park, to which considerable objection has been taken, was signed by President Wilson. President Wilson attached a statement to the bill in which he set forth his reasons for signing it: he is of the opinion that the pressing public needs of San Francisco will be best served, and that the usefulness of the park will not be impaired.

Water Supply in Cincinnati Now Normal.

Cincinnati, O.—The broken main on Eastern avenue has been repaired and the pumping of water has started. With the elimination of any danger of a water famine, the factories will soon be in operation again. An investigation into the cause of the break has been instituted by Council.

Water Users Forced to Pay.

Sacramento, Cal.—Over 300 non-paying users of city water have been discovered as a result of a city canvass made under Acting Superintendent W. F. Bailey. It is estimated that the city's income from water will be increased about \$1,000 per month, due to the investigation. For the month of October the water income was \$17,389 and from the quarter ending September 30th, \$38,719. In addition to the many non-paying users, there are probably a thousand people who have been charged less than they should.

Will Buy Carload of Meters.

Binghamton, N. Y.—The Board of Water Commissioners has voted to purchase a carload of water meters valued at \$13,000 for the purpose of meeting the demand for the coming year. Some months ago the Board passed a resolution that all new houses must be equipped with meters. The rush has been so great, owing to the large amount of building, that the Board is preparing to supply the demand.

To Install Hydrants.

Rhinebeck, N. Y.—The Town Board of Rhinecliff, a suburb of this place, at a recent meeting entered into a contract with the Rhinebeck Water Company for the installation in that village of thirty hydrants as a protection alike from fire and drought.

STREET LIGHTING AND POWER

Paris as "the City of Lights."

Paris, France.—More than ever is Paris maintaining its reputation for being "the city of lights:" great improvements have been made in its lighting system. The only electric lights on the boulevards were a line of globes sixty yards apart along the middle. The recent installation is a triple line of globes of a new style. The lights are three times the strength of the old ones, making the street almost as bright at night as at midday. Instead of being opaline or bluish, they are slightly rose colored. The new lamps burn in hermetically sealed globes, the material of which is not pure graphite, but graphite to which has been added various mineral salts, notably calcium. These globes, instead of being spherical, are flower-like. Paris is also testing new lamps of condensed gas. These prove comparable to the new electrics and are equivalent in price and efficiency, but differ in that the electrics are rosy and luminous, while the gas lamps are softer and more has 9,000,000 candle power.

Municipal Plant Shows Large Gain.

Pasadena, Cal.—Showing a net gain in customers of 192 for the month and a gross profit of \$5,409.15, of which sum \$3,774.27 is over and above the amount set aside out of the gross profits to pay for bonds and interest, the city light department made another fine record for October. The net profits of the municipal light plant in October were more than twice those of October last year, and the plant has more than \$12,000 in cash on hand. Its revenues from the commercial service was \$10,399.69, and its revenues from street lighting, including all the ornamental lighting service, was only \$4,016.

More "White Ways."

Waterloo, N. Y.—The new ornamental street lamps that have been recently installed in the business section of the village were turned on last week. The lights on Main street are a cluster of five large incandescent lamps and in the residential section the posts support one lamp of the same style.

Newberry, Fla.—Newberry has witnessed its first electric illumination last week. After the current was turned on everything worked splendidly and the street lighting was fine. Praises were given to McCrary company for the splendid work it had done here, and especially Superintendent Holbrook, who has had charge of the construction of the plant.

Rate Reductions.

Wilkes-Barre, Pa.—By threatening to build a lighting plant for Luzerne county to supply electrical current for the county court house, the County Commissioners, forced a reduction in light rates, which means a saving of \$5,000 annually.

Willimantic, Conn.—It was learned at the local office of the Rockville-Willimantic Gas and Electric Light company, that beginning on February 1 next, there is to be a reduction in the cost of gas. The present price is \$1.60 per thousand cubic feet, with a 10 per cent. discount allowed if bills are paid on or before the 10th of the month. The reduction is to be 10 cents per thousand cubic feet, or to \$1.50, with the discount of 10 per cent. in case of payment on or before the 10th.

Phila, Pa.—The Philadelphia Electric Company, in bidding for the 1914 contract for street lighting, has reduced its rates, upon the basis of which the city will save \$65,120.56 or will be able to install 772 additional lights without increasing the cost over that paid this year. This is the third reduction obtained from the company during the Blankenburg administration. The total amount of the contract on the basis of the present number of acres (14,421) is \$1,225,507.49, as compared with \$1,280,628.05 for this year. The bids are on the basis of night rates, and vary because of the difference in the cost of maintenance under different conditions. Following is a list of the bids for 1913 and 1914.

	Price per lamp per night	
For lights on overhead lines.....	23½c	22¼c
For lights on underground lines.....	28c	26¼c
For lights on city cables.....	23c	22c

FIRE AND POLICE

To Curb Speed of Fire Autos.

Providence, R. I.—A new rule, rigidly limiting motor-driven fire apparatus to a maximum speed of 25 miles an hour under any and all circumstances has been adopted by the Board of Fire Commissioners as one feature of a strict injunction against reckless driving in the department. In addition to establishing this inflexible speed limit the commission has also issued the general order that, while answering an alarm for fire, drivers shall not operate any apparatus with negligent disregard of existing conditions and the rights of others. As a further insurance of safe driving, the new rule states that when returning from a fire, or at any time except when on the way to a fire, autos shall comply with the traffic ordinances of the city, and with all other regulations which apply to speed and use of the streets.

Police Auto Squad Planned.

Chicago, Ill.—Chicago is to have a "flying police auto squad," according to a plan devised by Chief James Gleason. The automobile owned by the City, which was formerly given over to the private use of ex-Chief John McWeeny will have a regular station in front of the detective bureau as soon as it comes from the repair shop. To emergency calls Captain John J. Halpin, head of the detective bureau, and four picked detective sergeants will respond in the machine.

Police School Shows Good Results.

Philadelphia, Pa.—An exhaustive report on the work of the Training School for Police Service for the first six months of its operation has just been submitted to Director Porter by Lieutenant Harry C. Davis, acting inspector and instructor, who finds that much good has resulted from the experiment. In his report Lieutenant Davis says:

The standard of police service has been raised and the whole tone of the police force has been changed as a result of the work of the training school.

Policemen in all the districts of the city are performing their duties more efficiently. This school was started for the primary purpose of systematizing the work of the police, and of extending to them the opportunity of receiving instruction in the regular duties of a policeman under the laws of the State and the ordinances of the municipality.

Classes in the school attend from Monday until Saturday, and then return to their districts for three weeks. They come back to the school the fourth week for their second week of instruction. The classes attend for a period of four weeks, and at the end of this time there is a general examination.

Increase Salary of Police.

Brockton, Mass.—The Aldermen have sent to the finance committee a request to grade the salaries in the Police Department, the order providing for the following increases: Deputy marshal, \$1500 from \$1300; captains, \$1400 from \$1200; lieutenants, \$1300 from \$1200; inspectors and sergeants, \$1300 from \$1200; patrolmen, five years in service, \$1200 from \$1100.

Willing to Accept Half Pay to Aid City.

Pensacola, Fla.—Should the city suffer from any financial stringency because of the closing up of the Pensacola State Bank, the policemen and firemen would be content to draw but half salary until the possible stringency would be passed over. In a communication to the Board of Commissioners the firemen stated that they stood ready to stand the temporary reduction in salary from now on, and until the city could recover from its financial depression. Police Chief Sanders presented a similar communication from his men.

Motorcycle Corps Efficient.

New York, N. Y.—The motorcycle corps of the New York police department has proved one of the most efficient branches of the service, according to reports submitted to the International Exposition of Safety and Sanitation. Although the corps includes only 22 men, this small force has effected the arrest of over 13,000 persons during the year. Most of the arrests have been for speeding automobiles or other automobile offenses and the total of fines imposed have been over \$117,000.

Will Use Keyless Alarm Box.

Wilmington, Del.—Fire officials in this city are experiencing much trouble with the tampering of fire-alarm boxes. In an effort to devise a means whereby no person can tamper with a box without being detected, the fire committee of council decided upon the keyless box. Ten of these will be installed at present, and if they prove satisfactory, it is the intention of the Wilmington officials to place keyless boxes in every section of the city.

Motorcycle Brigade to Clear Streets.

Gadsden, Ala.—Fire Chief Stallings may use the motorcycle brigade of the fire department to spot violators of the traffic law. There are four motorcycles at the disposal of the department. For several months, in fact ever since the new automobile fire truck was put in service, great difficulty has been encountered in keeping vehicles off the

streets so the fire wagons can make the run without endangering lives and property. The object of the motorcycle brigade will be to clear the streets so that all accidents may be avoided.

Penalty for Naps.

Detroit, Mich.—Police Commissioner Gillespie has ordered patrolmen found to have slept on their beats to work an hour overtime for every minute they sleep on duty. One was told to serve 60 hours for an hour's sleep and another 10 hours for 10 minutes.

MOTOR VEHICLES

Favor Complete Motorizing of Fire Department.

Canandaigua, N. Y.—The trial of the motor truck purchased by the city last summer having resulted in a pronounced success, consideration is now being given to the idea of equipping the entire city Fire Department with motor-driven apparatus and discarding the expensive horses and their equipment. The city has two two-horse teams and one single horse that it is supporting and it is now proposed to sell the animals, trucks and chemical engines, and use the proceeds towards the purchase of two motor chemical trucks and one hook and ladder truck. It is figured that the saving to the taxpayers in horse feed, maintenance and salaries would amount to large sums yearly.

To Test Auto Engines.

Racine, Wis.—The two new American-LaFrance combination chemical and pumping autos, purchased by the city at a cost of \$17,000, have arrived in Racine. Before being accepted by the city, the two new pieces of fire apparatus will be submitted to a severe test to determine the pumping capacity and pressure of the machines and their ability to pass over the muddiest road.

Decide to Purchase Brockway Truck.

Cortland, N. Y.—The new motor-driven combination chemical and hose wagon, built by the Brockway Motor Truck Company for use in this city, has been given a thorough trial on the paved streets. The Board of Fire Commissioners has practically decided to purchase this machine, with the understanding that the company will make good any defect or lack of efficiency it may show during the winter.

Bridgeport Accepts Waterous Engine.

Bridgeport, Conn.—The splendid new Waterous gasoline pumping engine and automobile hose wagon have been placed on duty at the fire house in Norman street. The machines have been formally accepted by the city and the bills will be approved at the meeting of the Board of Fire Commissioners.

GOVERNMENT AND FINANCE

Bond Selling to Small Investors Successful.

St. Paul, Minn.—The success of this city's plan of selling municipal bonds over the counter to the small investor has been proven. This was indicated in a report of the city treasurer, which showed that the residents of the city, those who have little to invest but want to invest that judiciously bought \$1,000,000 worth of the documents since July 1. The bonds were sold in small certificates with 5 per cent interest payable on demand.

To Sell City Bonds Direct.

Jersey City, N. J.—It has been proposed to have the city try the plan of selling city bonds in small denominations direct to citizens without the intervention of bond dealers. The difficulty of selling bonds in large amounts through the usual bond houses at this time has given additional interest to this new plan. It is understood that the Hudson County Citizens Federation has given the proposition some thought, and that it is prepared to back the plan and assist

in whatever way it can. The suggestion made is that instead of selling the city bonds only in large denominations of a thousand dollars the city try the plan of disposing of bonds in amounts of \$100 and \$500, so as to interest private citizens with limited means.

Favor Commission Form of Government.

Hopkinsville, Ky.—At a mass meeting of several hundred citizens a resolution has been adopted declaring in favor of Hopkinsville being made a city of the third class with a view to having a commission form of government. George E. Gary presided and those who spoke for the change were John Franklin Bible, Hiram E. Brown, Robert A. Cook, Mayor C. M. Meacham and former Senator Frank Rives. The resolution called on Representative-elect Duffy and Senator-elect Salmon to introduce a bill in the legislature putting Hopkinsville in third class and the chairman was authorized to appoint a committee of ten to assist in formulating plans.

Choose Council-Manager Plan.

Manistee, Mich.—By a majority of 767, voters carried the new charter in this city. The city of Manistee will now follow the plan of Cadillac and install a general manager to handle the administrative work of the community. The new charter provides for the election of a mayor and four councilmen for terms of five years. Those officials will appoint the general manager and fix his salary. They are subject to recall at the end of each year by majority vote of the electors. Five supervisors, four justices of the peace and one constable are the only remaining elective officials to be chosen. The charter bestows upon the people the right of initiating ordinances and the right of referendum, or final approval of ordinances.

Defeat Commission Government.

Columbus, Ga.—An election has been held under a special act of the last legislature on the question of the adoption of a charter providing for a commission form of government for the city, to take the place of the Board of Aldermen. The result was 792 against the commission form of government and 318 for, or a majority of 474 against.

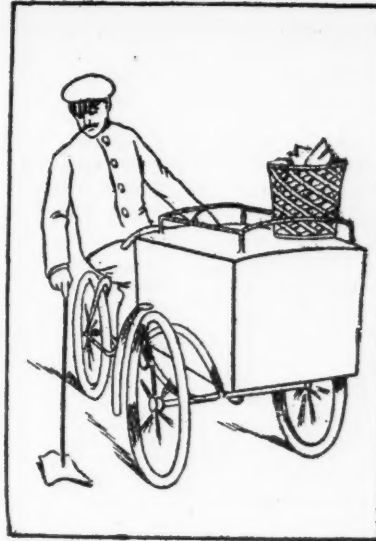
For Commission on Municipal Credit.

Edmonton, Alta.—Hon. Charles Stewart, Minister of Municipal Affairs for Alberta, is working on a plan for the appointment of a provincial commission on municipal credit, which will be submitted to the legislature at the next session in Edmonton in the event it is not taken up directly by the provincial council, as now planned. The commission would assist rural municipalities, of which there are eighty-four in Alberta at present, in marketing their bonds, at the same time checking expenditures for improvements in communities, where there is no pressing need for them, or arranging for carrying out the work on a more conservative scale. The Department of Municipal Affairs at present lends its approval to flotation of bonds. The effect of the new plan is that the taxpayers know exactly to what they are committing themselves.

STREET CLEANING AND REFUSE DISPOSAL

Use of Cans to Facilitate Garbage Collections.

Wilmington, Del.—A conference relative to garbage complaints has been held between the members of City's Council, sitting as a committee of the whole, and the garbage contractors. As a result the contractors agreed to order their drivers to greater activity and carefulness in making their rounds. It was shown that occupants of houses are at fault in many cases. Unfavorable conditions with which they have to contend were enumerated by the contractors showing that the fault is not always with the man doing the collecting. The contractors favored the placing of garbage in cans and setting them along the curb and then having specified days on which they would make collections in each section of town. Under such an arrangement they said they could collect all over the city every other day.



TRICYCLE CART.

the important one that no dust is raised, as would be the case if the paper was swept up.

Paris to Rid Streets of Waste Paper.

Paris, France.—Paris is endeavoring to surpass Berlin in its reputation for clean streets. Hitherto the boulevards of Paris were littered with waste paper. Now a new squad of cleaners, mounted on tricycle carts, rid the thoroughfares of every scrap of paper. The men pick up the paper with spiked sticks and drop it into a waste paper basket on top of the cart. When this basket is full it is emptied into the box. Among the several advantages of this form of street cleaning is

Enlist Aid of "Movies" in Clean-up Campaign.

Chester, Pa.—Aroused to action by the evils shown them in their own town, residents of Chester are preparing to wage a war on unsanitary conditions. Mayor Ward presided over a meeting of the Suburban Planning Association. Plans were inaugurated to conduct a vigorous campaign in cleaning up the slum district of Chester, in which very unsanitary conditions prevail. An effort will be made to create a health department similar in powers to those in large cities. To vividly bring to the attention of people the unsanitary conditions existing, pictures of the worst places in the city will be taken and exhibited in moving picture houses.

To Use Motor-Driven Sprinklers.

Lynchburg, Va.—Steps are being taken looking to a reorganization of the street cleaning department of the city. While the city has increased its miles of paved streets from 12 miles in 1907 to nearly 20 at present, the street cleaning force has not been augmented. The department has a difficult problem to contend with and City Engineer Shauer is said to believe that its solution will lie largely in the purchase of a motor-driven device to sprinkle and sweep the streets.

MISCELLANEOUS

Insurance for City Employees.

Berkeley, Cal.—A compensating insurance fund for the protection of the city's employes has been created here by the enactment of a municipal ordinance. By its terms employes will receive compensation for disabilities sustained in the course of their duties. A tax of one-half cent on each \$100 of assessed valuation will be levied as a necessary start until the fund totals \$10,000.

To Install Voting Machines.

Nashville, Tenn.—Voting machines may be in use in elections in Nashville in the near future, Mayor Hilary E. Howse having stated, that he was inclined to favor the use of such machines, and that he intended to make an investigation. In New York and a number of other cities voting machines have been in use for years and have proved highly satisfactory. They are regarded as a safeguard against the perpetration of fraud, and render it possible to ascertain the vote for each candidate immediately on the closing of the polls. On account of the primitive methods in vogue in this city many hours frequently elapse before the vote for the several candidates is ascertained. The agitation for voting machines has been increasing in Nashville for some time, and it is generally predicted by men

who have studied the question that the installation of the machines here would meet with public and popular approval from all voters.

City To Compete With Contractors.

Altoona, Pa.—Councilman F. E. Rooney, who recently assumed office under the commission form of city government, and who has taken charge of the department of highways and public improvements, announces that hereafter his department will submit bids and compete with contractors for city work. The law requires that all public work shall be performed under contract, but Mr. Rooney has been assured that there is no legal objection to the city entering into competition with other contractors, and this will be done whenever in the interest of economy it is deemed advisable.

To Regulate Width of Vehicles.

Providence, R. I.—An amendment to the ordinances regulating the size and weight of vehicles using the public streets which shall limit the width of all such vehicles to seven feet eight inches and their capacity weight to 10 tons, will be recommended in the Common Council, Jan. 5, by the committee on ordinances. The capacity weight of 10 tons is the same as at present, but the recommendation to limit the width of the vehicles comes as the result of a resolution introduced by Councilman Percy A. Harden and referred to the ordinance body for consideration. A recommendation that vehicles of greater width than seven feet eight inches be allowed to use certain streets for special reasons upon the issuance of a permit by the Commissioner of Public Works will also be included in the committee's report, the body holding that certain emergencies might require the use of unusually large vehicles.

City to Have New Auditing System.

Reading, Pa.—City Council, at the suggestion of the Chamber of Commerce, voted unanimously to give to the New York Bureau of Municipal Research the contract for organizing a new system of auditing the city's accounts. It was stated that the bureau would give the city a scientific and thorough method of keeping the city's accounts, such as is used in New York, Minneapolis, and Pittsburgh. The bureau will audit: Appropriation and fund records, expenditure records, subsidiary and general ledgers, time and service records, central purchasing records, store accounting records, financial statements and reports; prepare and establish a budget system; prepare and institute accounting records to control water revenues, inspection records, complaint records and reports, mortgage tax records.

Saves \$2,086,076 for City.

New York, N. Y.—Besides establishing a system for purchasing city supplies that will yield financial benefit to the city for years to come, Supervisor of The City Record David Ferguson in his annual report to the Mayor has shown that he had actually saved the city \$2,086,076.57 in the three years he had been in office. This saving was not effected at the cost of service, as the report shows that the efficiency of the office has been substantially advanced, particularly in the matter of standardizing the quality of the vast variety of printing, stationery, and blankbook supplies purchased by The City Record for 239 departments maintained by the city. Although The City Record office edits and publishes the official journal of New York, it is primarily a purchasing office for nearly all branches of the City Government. Formerly the purchasing was done in a haphazard and costly manner. Approved scientific methods are now employed. Not only are competitive bids received on every order but the specifications are based upon careful analysis made by experts. The \$2,086,076 mentioned in the report does not represent the total savings, which are very much greater because of the increased quantities of supplies furnished as compared with 1909. In 1912 the office was run for \$648,538.33 less than in 1909; in 1911 it was run for \$744,176.98 less than in 1909, and in 1910 it was run for \$693,361.06 less than in 1909, although in each of those years

more supplies were furnished. In 1912, for instance, about 22 per cent. more supplies were furnished than in 1909, although the cost of conducting the office was more than \$500,000 less. In 1909 the per capita cost of The City Record office was 38 cents and 1 mill, and in 1912 it was 20 cents and 7 mills. In other words, the 1909 per capita cost was nearly 90 per cent. greater than the 1912 cost.

Ask for Municipal Milk Plant.

Jamestown, N. Y.—The Jamestown Common Council has recommended to the voters of Jamestown the report of the Board of Health in favor of the establishment of a municipal milk plant in this city, in accordance with recommendations of Mayor S. A. Carlson. The amount asked for this purpose is \$25,000. The plans provide for a pasteurizing plant, and the buying and distribution by the city of all the milk consumed here. The board estimates that the cost of the milk, with its treatment and distribution, would amount to \$336,345 a year, and that the sale of the same amount of milk as now used would bring in a revenue of \$394,200, thus giving the city a profit of \$57,455 a year.

Chicago May Assume Care of "Jobless."

Chicago, Ill.—The Committee on Unemployed appointed some time ago by Mayor Harrison will urge upon him the creation of the office of "Emergency Superintendent," having complete charge of providing food, clothing, lodging and work for men in Chicago who may be out of work in the winter season. According to figures given out by the United Charities recently, 5,500 men have been discharged from employment in the South Chicago district in the last three weeks. Steps suggested to relieve this situation in Chicago were embodied in a report presented to the mayor's commission by the committee on homeless men, composed of representatives of various charitable organizations. The suggestions follow: Prevention of the influx of the unemployed. Furnishing of one substantial meal a day at the municipal lodging-house. Citizens are asked to employ help through the agency of the municipal lodging-house when possible. Daily payment of men employed for temporary work. Payment of railroad construction workers when they are laid off. Provision of facilities for cashing checks without fee. In discussing these suggestions Chief of Police Gleason said that if men who are discharged from their work could get their pay immediately instead of being obliged to wait for a regular pay day a great many of them would not be thrown as a burden upon the community. Dr. Murray of the Health Department said present conditions are 500 per cent. worse now than those a year ago.

Cities to Plant Trees.

McAlester, Okla.—Mayor Enloe has set apart a day to be known as Tree Day and issued a proclamation asking every citizen to plant trees that day. Over 3,500 trees have been donated for the public parks. These will be planted by a force of convicts from the State penitentiary. The citizens will plant as many more in private grounds and parkings.

Colorado Springs, Colo.—An ordinance creating tree planting district No. 1 has been passed by the City Council. The city forester will send notices to property owners in the new district notifying them that they have until January 1 to decide whether to put in trees as provided by the ordinance or leave the work to the city and have the cost assessed against their property. The new ordinance provides for the planting and maintenance for three years of not more than 1,607 trees in the district at a cost of not more than \$4 each.

Purchase Pulmotor.

Rahway, N. J.—Upon motion of Commissioner Randolph, the Board of Health has voted to purchase a pulmotor at a cost of \$150. This will be for the use of the Rahway physicians in the city and vicinity. The instrument will be kept at police headquarters, so that physicians may obtain it at any time. Dr. W. E. Cladek and Health Officer Dr. F. W. Sell were named a committee to purchase the pulmotor at once.

LEGAL NEWS

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Bid for Sewer Construction—Misunderstanding.

City of Dawson Springs v. Miller Coal & Contract Co.—Where the parties to a contract for installing a sewer system did not understand each other as to what was required by the contract and specifications when plaintiff's bid was made and accepted by the city, upon their failure to agree as to the construction of the bid the city will be required to return to plaintiff the deposit made, leaving the parties where they were originally.—Court of Appeals of Kentucky.

Bonds—Validity—Estoppel.

Town of Aurora v. Gates.—The certificate in the bonds signed by the mayor attested by the clerk and by the official seal of the town that "all acts, conditions and things requisite to be done precedent to and in the issuing of said bonds have been done and performed in regular and due form as required by law" estops the town from defeating the bonds in the hands of an innocent purchaser for value on the ground that the enabling ordinance was never published.—United States Circuit Court of Appeals, 208 F. R. 101.

Public Water Supply—Special Assessment.

Pomroy et al v. Board of Public Water Works, Dist. No. 2, of City of Pueblo et al.—So much of the purchase price of a water works system as is used to pay for the parts of the system which furnish water, not only where the mains are already laid, but where they may be laid in the future, such as a pumping plant, water rights, and similar items, are for the general benefit of the property and inhabitants of the district, and a special assessment cannot be levied against the lots in front of which mains are laid to pay therefor.—Supreme Court of Colorado, 136 P. R. 78.

Filtration—Negative Head—Validity.

New York Continental Jewell Filtration Co. v. City of Harrisburg.—The Jewell patents No. 644,137 and reissue No. 11,672, respectively, for a process and apparatus for filtration of water, consisting of the use of a new type of sand filter known as the down draft or negative head filter, which by creating a vacuum through the use of a vertical discharge pipe in the bottom utilizes the whole sand bed as a filtering agency, whereas the sediment layer forming on its surface had previously been the only effective agency, were not anticipated and disclose a useful and novel invention; also held infringed.—United States District Court, 208 F. R., 10.

Sidewalks—Reconstruction—Width.

Van Valkenburgh v. City of Milwaukee.—The determination of the Board of Public Works of a city that a certain sidewalk is so defective as to require construction of a new one is conclusive if it rests on any reasonable basis, and will not be overturned except in a case showing a clear abuse of authority. Where a contractor's agreement with a city was to replace defective sidewalks with cement walks as ordered in writing by the city's board of public works, and the board ordered a specified walk containing 480 square feet in front of plaintiff's property, the contractor's authority was limited by the order, and he could not recover for a wider walk required by a city ordinance.—Supreme Court of Wisconsin, 143 N. W. R. 1052.

Automobile Omnibus—Regulation.

Morristown-Madison Auto Bus Co. v. Borough of Madison.—A borough ordinance made it unlawful to make use of any motor vehicle within the borough for the transportation of passengers for compensation without license as provided in the ordinance. The Borough Council was authorized to grant licenses to persons keeping and using for hire vehicles for the transportation of passengers within the borough. Held, that the prohibition was necessarily limited by the restriction of the licensing power of the Council to

the use of vehicles for transportation of passengers within the borough, and did not apply to the transportation of passengers from a point in the borough to a point in another municipality.—Supreme Court of New Jersey, 88 A. R. 829.

Injuries from Defective Sidewalks.

Gielen v. City of Florence.—In an action against a city for damages for personal injuries resulting from plaintiff's having stumbled at night over a pile of bricks which had been allowed to remain for two weeks on a sidewalk continually used by the public, whether the obstruction existed for a length of time sufficient to charge the city with notice, whether the city was negligent in failing to restore the sidewalk to a reasonably safe condition for travel before plaintiff was injured, and whether plaintiff, who knew two or three weeks before the accident that single bricks were scattered along the sidewalk, but had no later knowledge of conditions, was guilty of contributory negligence, held to be questions for the jury.—Supreme Court of Nebraska, 143 N. W. R. 932.

Street Improvement—Contractor's Default—City's Liability.

Burnham v. City of Milwaukee.—Where a city in the exercise of its public powers contracted for a change in the grade of a street and the construction of an approach to a bridge, it was not liable for injuries to an abutting owner due to the fault of the contractors in encumbering the street with tools, men, engines, sheds, wagons, and appliances for a long time after the date fixed by the contract for the completion of the work had expired, impairing or preventing access to plaintiff's premises, etc.; the plaintiff's cause of action being solely against the contractors. Failure of a city to enforce penalty clauses in contracts for public work does not give rise to a cause of action in favor of an adjoining property owner against the city.—Supreme Court of Wisconsin, 143 N. W. R. 1067.

Excessive Assessment—Payment—Effect.

Schmidt v. City of Milwaukee et al.—St. 1911, 4, with reference to special assessments, provide that if the property owner's claim is that the tax is invalid because of defects going to the validity of the assessment he shall pay the same as a condition of the right to maintain an action to recover it, and if reassessment is ordered and the court determines that the amount which plaintiff ought justly to have paid is less than the original assessment, he shall recover damages for the difference. Held that, where a property owner sued to set aside illegal special assessment certificates, and to obtain a reassessment, that he had previously paid the assessments to the treasurer and that the latter had paid over the amount to the certificate holder, was irrelevant, since the city was responsible for the illegal portion of the assessment on the ground that it had compelled plaintiff to pay more than he could justly be compelled to pay and was liable in damages for its wrongful act.—Supreme Court of Wisconsin, 143 N. W. R. 1066.

Paving—Resurfacing—Statutes.

Hoefer et al v. City of Milwaukee et al.—Laws of 1911 provides that no property fronting on any street in any city of the first, second or third class shall be exempt from any assessment for the paving of the street with a permanent pavement having a concrete foundation, or the curbing or resurfacing of "such street or avenue" until such property shall have paid in the aggregate in assessments for street pavements \$3 per square yard. Held, that the word "pavement" includes all things necessary to make a level surface for horses and foot passengers of any convenient material and all necessary excavation or filling, as well as laying the paving stones or other surface material, and that the words "curbing or resurfacing of such street or avenue" were not limited to streets or avenues with a permanent pavement having a concrete foundation; the exemption being taken away from abutting property in three cases: First, where paving with a permanent pavement on a concrete foundation; secondly, curbing; and, thirdly, resurfacing.—Supreme Court of Wisconsin, 143 N. W. R. 1037.

NEWS OF THE SOCIETIES

Calendar of Meetings.

December 29-January 3.
AMERICAN ASSOCIATION OF THE ADVANCEMENT OF SCIENCE.—Sixty-fifth annual meeting, Atlanta, Ga. L. O. Howard, Secretary, Smithsonian Institution, Washington, D. C.

January 5-7.
SOCIETY OF CONSTRUCTORS OF FEDERAL BUILDINGS.—Fifth annual convention, Washington, D. C. T. R. Maul, Secretary, 409 P. O. Building, Philadelphia, Pa.

January 10.
MUNICIPAL ENGINEERS OF THE CITY OF NEW YORK.—Eleventh Annual Dinner, Hotel Savoy. George A. Taber, Secretary, 29 West 39th St.

January 16.
AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—Annual meeting, New York City. J. R. Wemlinger, Secretary, 11 Broadway, New York City.

January 20-22.
AMERICAN WOOD PRESERVERS ASSOCIATION.—Tenth annual convention, New Orleans, La. F. J. Angier, Secretary, Timber Preservation Company, Baltimore, Md.

January 21.
AMERICAN SOCIETY OF CIVIL ENGINEERS.—Annual meeting, New York. Chas. W. Hunt, Secretary, 220 West 57th street, New York City.

January 21-23.
AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS.—E. A. Scott, Secretary, 29 West 39th street, New York City.

January 27-29.
AMERICAN ELECTRIC RAILWAY ASSOCIATION.—Mid Year Meeting and Banquet, New York, N. Y. E. B. Burritt, Secretary-Treasurer, Engineering Societies' Building, 29 West 39th Street, New York, N. Y.

January 29-31.
CANADIAN SOCIETY OF CIVIL ENGINEERS.—Annual meeting, Montreal, P. Q. Prof. C. H. McLeod, Secretary, 176 Mansfield street, Montreal, Canada.

February 12-14.
NATIONAL CONFERENCE ON CONCRETE ROAD BUILDING.—Auditorium Hotel, Chicago, Ill. J. P. Beck, Secretary, 72 West Adams St., Chicago, Ill.

February 16-20.
NATIONAL ASSOCIATION OF CEMENT USERS.—Fourth Annual Convention, Chicago, Ill. Edward E. Krauss, Secretary, Harrison Building, Philadelphia, Pa.

February 26-27.
INDIANA SANITARY AND WATER SUPPLY ASSOCIATION.—Seventh annual meeting, Hotel Severin, Indianapolis, Ind. Dr. W. F. King, Secretary, Indianapolis.

The Chicago Technical League.

There was formed in February, 1912, an organization of civil engineers which would seem to be unique in its aims, which are suggested by the fact that it is affiliated with the American Federation of Labor. The members "believe that if each individual member of the engineering profession was to give part of his time to a detailed study of this question (remuneration commensurate with the responsibility involved and the duties performed), and embody his ideas with those of his fellow-workers into one general plan, it will be only a question of a very short time until he will see his plans gradually develop into that structure of which he has often dreamed but for which he has hoped in vain the realization of that aim." At the present time the organization numbers something over 100 members who act as municipal, sanitary, paving, bridge, structural and concrete engineers and technical writers. Any person is eligible who follows civil engineering in any of its branches, who is not an employer, and who can qualify as to experience requirements. The dues are 50 cents per month. The sec-

retary is Louis A. Heyn, 32 North Fifth avenue, Chicago.

County and City Health Officers of Kentucky.

The second annual conference was held in Louisville, December 8-10. The meeting was called to order at the Armory by Dr. John G. South, Frankfort, president. The address of welcome was made by Judge Muir Weissinger, and the response by E. H. Mark, sanitary engineer of the State Board of Health.

Attendance at the conference by either the county health officer or the county judge of each county in the state is compulsory by law, and the expenses of the official representing his county are paid by the state. All of the state health laboratories were represented in the conference with exhibits in operation to demonstrate the work in which each is engaged and with what degree of efficiency. In addition, charts and maps prepared to show exact sanitary and health conditions in each county of Kentucky were on view.

Among the papers presented were the following: "Health Conditions in Kentucky and Suggested Remedies," by Dr. McCormack, secretary State Board of Health. In the course of the address it was stated that during the past 33 months 136,412 specimens were examined in the bacteriological laboratory.

"An Invoice of Health Conditions in Kentucky as Shown by Thirty-three Months of Operation of Our Model Village Statistics Law," by Dr. W. L. Heizer, Registrar of the State Board of Health.

"Accurate Vital Statistics the Basis for Health Work," by Cressy L. Wilbur, statistician, department of vital statistics, United States Census Bureau.

"The Economics of Having Whole Time Health Officers," by L. I. Dublin, chief statistician Metropolitan Life Insurance Company, of New York.

"What Has Been Accomplished by a Whole Time Health Officer in Jefferson County," by Dr. B. W. Smock, county health officer.

"Co-operation Between County Health Officer and County Superintendent," by Orville Stivers, superintendent Jefferson county schools.

"Importance of Medical Inspection of Schools," by Dr. P. F. Barbour, Louisville.

"School Hygiene," by Dr. Wm. King, assistant secretary Indiana State Board of Health.

"Preliminary Report on Trachome Work in Kentucky," by Dr. John McMullen, surgeon U. S. Bureau of Public Health.

"The Value of the Laboratory in County Health Work with Special Reference to the Milk Supply," by Dr. E. B. Bradley, Lexington.

"What a Whole Time County Health Officer Can Do in Preparing for a Dispensary Campaign," by Dr. M. W.

Steele, inspector State Board of Health of Kentucky.

"Personal Hygiene," by Dr. J. N. Hurty, secretary Indiana State Board of Health.

"Value of Work of State Bacteriological Laboratory with Study of Methods and Difficulties," by Dr. Lillian H. South, state bacteriologist State Board of Health of Kentucky.

"Health—an Asset," by the Hon. S. W. Green, Louisville.

"Necessity in the South for Whole Time County Health Officers," by W. S. Rankin, M. D., secretary North Carolina State Board of Health, Raleigh, N. C.

"Hookworm Disease," by Dr. J. S. Lock, sanitary inspector State Board of Health of Kentucky.

"Rural Hygiene," by Dr. J. N. Hurty, secretary Indiana State Board of Health.

"The Kentucky Sanitary Privy," by Dr. J. N. McCormack, Bowling Green.

"Prevention of Typhoid Fever," by Dr. L. L. Lumsden, surgeon United States Public Health Service.

"What Can Be Done by a Whole Time County Health Officer in Pure Food and Drug Work," by R. M. Allen, head food and drug division, Experiment Station, Lexington.

"Preliminary Report on Survey of the Drinking Waters of Kentucky with Suggestions as to Their Improvement," by Dr. E. H. Mark, state sanitary engineer, State Board of Health of Kentucky.

"The Essentials of a Good Water System for a Small City," by Theodore A. Leisen, chief engineer Louisville Water Company.

"How a Whole Time Health Officer Could Help in the Prevention of Tuberculosis," by Dr. Everett Morris, member State Tuberculosis Commission.

National Commercial Gas Association.

The ninth annual convention was held at the Academy of Music, Philadelphia, December 1-6. One of the most interesting exhibits was that of the Pennsylvania Globe Gas Light Co., of Philadelphia who operated a row of 36 gas lamps along the curb on Broad street, in the exhibition section, fed by high pressure pipe located in the gutter. The posts were graceful in design and supported two mantle lamps enclosed by 18-in. opal globes. These lamps were 12 ft. above the pavement and spaced 27 to 30 ft. apart and the posts are a new pattern as well as the lamp. The compressing plant was located in the industrial exhibit room, being a duplicate equipment consisting of ½-h.p. electric motor belt-connected to an 8-in. Leiman blower and delivering gas into a receiver, and then a 1¼-in. pipe under 3 lb. pressure to the street lamps. These lamps gave about 1,100 c.p. each. The blower installation was lighted by a single inverted mantle lamp of 500 c.p., designed for interior use. The illumination furnished by these street lamps was exceedingly satisfactory, the light being well diffused, of a pleasing warm color and just abundant enough.

PERSONALS

Allen, James, Olympia, Wash., has been appointed chief engineer of the State Highway Department by Commissioner William R. Roy, succeeding W. R. White.

Burns, Dr. R. G., assistant superintendent of the bureau of bacteriology in the Pittsburgh department of public health, has been appointed superintendent of the bureau of sanitation in the department of health. The position has been vacant since the death of Dr. H. K. Beatty.

Hatton T. Chalkley, consulting engineer, Wilmington, Del., has been chosen chief engineer of the Milwaukee Sewerage Commission at a salary of \$10,000 a year, to have charge of that city's \$15,000,000 sewerage system and disposal plant.

Edwards, William, street cleaning commissioner, New York City, has received a medal from the National Highways Protective Society for services in protecting the public on highways.

Howe, Herbert Roys, secretary of the Howe Engine Co., Indianapolis, Ind., died December 7.

Nelson, A. H., Atlantic City, N. J., has been appointed county engineer succeeding E. D. Rightmaier.

Roy, Wm. R., Spokane, Wash., has been appointed state highway commissioner succeeding Wm. J. Roberts, resigned.

Waite, H. M., city engineer of Cincinnati, O., has been appointed City Manager of Dayton, O.

The following city officials have recently been elected or appointed:

Versailles, Ky.—B. F. Thompson, city clerk, re-elected; W. A. Dale, chief of police, re-elected; B. F. Thompson, engineer water works plant.

Nicholasville, Ky.—Mayor, W. L. Steel; John W. Cooper, chief of police; Frank D. Smith, chief of fire department.

Louisville, Ky.—S. M. Wilhite, city controller, reappointed by Mayor J. H. Bushmeyer.

Gloucester, N. J.—J. A. Corcoran, president fire department.

Atlanta, Ga.—Geo. Matthewson, chief of county police.

Darby, Pa.—Geo. Humphreys, president fire department.

Macon, Ga.—G. S. Riley, chief of police.

Mt. Sterling, Ky.—Alex Kirby, street commissioner; J. W. Williams, engineer.

Humboldt, Tenn.—H. A. Seuter, mayor.

Santa Monica, Cal.—T. H. Dudley, mayor.

Morrison, Ill.—A. D. Stone, chief of fire department.

Milvale, Utah.—T. A. Smith, chief of fire department.

Ennis, Tex.—W. D. Farris, mayor; E. Raphael and Lou Mims, commissioners.

Dayton, O.—J. B. Harshman, clerk to city commissioner.

Fostoria, O.—R. C. Kessler, member board of health.

La Porte, Ind.—Swan A. Swanson, city controller; John H. Harding, superintendent of the waterworks; A. Drew Goddard, city engineer; Lee L. Osborn, city attorney; William Plambaek, street commissioner; The Mayor, Engineer Goddard and Street Commissioner Plambaek, board of public works.

South Bend, Ind.—Fred W. Keller, mayor-elect, has made these appointments: Controller, U. G. Manning; city attorney, E. F. Seebirt; board of works, A. H. Rice, E. M. Morris and J. B. Weber; board of safety, John A. Hibbard, B. F. Augustine and Clement Smogor; board of health, Dr. F. H. Eastman, Dr. Charles Rosenbury and Dr. Walter N. Baker.

Kokomo, Ind.—George W. Stidger, mayor-elect, has made these appointments: Board of public works, Thomas Flynn, William J. Webb, and William B. Helmick; board of health, Dr. Edgar Cox, secretary; Dr. S. Roscoe Chancellor, Dr. O. D. Hutto; police commissioners, William J. Carroll, city attorney, Joseph C. Herron city engineer, W. F. Mann; assistant city engineer, Carl G. Yarling; fire chief, Edward Shauman. Mr. Stidger says he favors the recall for municipal officers.

Lafayette, Ind.—Mayor-elect, Thomas Bauer has announced the appointment of John Fisher as superintendent of police, Charles M. Johnston, as chief of fire department, and Harry Overesch, city engineer.

Henderson, Ky.—Joe Adams, city clerk; Posey Bailey, chief of police.

Harrodsburg, Ky.—J. G. Pulliam, mayor; J. P. Smith, chief of police; Albert Riley, superintendent of lighting plant; W. S. Barney, superintendent water plant.

Carrollton, Ky.—Harry Lorch, city clerk; Robert Bartlett, electrician.

Cincinnati, O.—Commissioner of public affairs, Mayor George E. Phillips; commissioner of public safety, Henry B. Schuler; commissioner of finance, Harry Percival; commissioner of public works, Theodore Kluemper; commissioner of public property, Mason Howk.

Hopeville, Ga.—J. D. Humphries, mayor.

Carnesville, Ga.—R. F. McKinney, mayor.

Clarkesville, Ga.—F. L. Asbury, mayor, re-elected.

Dalton, Ga.—D. B. Bowen, mayor.

Baxley, Ga.—D. M. Parker, mayor.

Lenoir City, Tenn.—F. A. Weis, Mayor.

Sweetwater, Tenn.—D. S. Bradley, J. M. Jones and W. T. Lenoir, commissioners.

Lewisburg, Tenn.—J. A. Loyd, mayor.

Philadelphia, Pa.—J. C. Dickerman, chief of the bureau of gas.

Pittston, Pa.—Emil Weber, chief of fire department; E. L. McHugh, city electrician.

Fairmont, W. Va.—Anthony Brown, mayor.

Meriden, Conn.—D. J. Donovan, mayor.

Jacksonville, Fla.—Lloyd D. Smoot has been appointed commissioner of public works; he will retain the position of chief engineer; John E. Ballinger has been appointed engineer of Duval county.

Peekskill, N. Y.—C. E. Forbush, engineer fire department.

Schenectady, N. Y.—City engineer elect Wm. B. Landreth has announced that W. Earl Weller will be his deputy; commissioner of public works-elect has selected Wm. W. Chadsey as his deputy; William Schoppman will be superintendent of sewers; Chas. Hogan, superintendent of streets.

Westbrook, Me.—G. O. K. Robinson, mayor.

New Providence, N. J.—J. J. Badgley, fire chief.

Richmond, Ind.—William J. Robbins, mayor-elect, has announced his appointments for various city jobs. They are: City controller, E. G. McMahan; city attorney, William A. Bond; board of public works, Alfred Davis; John McMinn, Charles A. Marlatt; police commissioners, Roy C. Fry, William F. Eversman, C. A. Drathring; chief of police, Harry Goodwin; chief fire department, Edgar Miller.

Lynn, Mass.—Thomas Campbell, water commissioner, re-elected; Geo. A. Cornet, commissioner of public property.

Woburn, Mass.—Jack Geraghty, alderman, elected on "better roads" platform.

Salem, Mass.—Thomas J. Lally, director of public health.

Lowell, Mass.—Charles J. Morse and J. H. Carmichael, commissioners.

OREGON.

Milton.—Dr. McQuory, mayor.

Union.—Chas. Davis, mayor; J. W. Ferguson, street commissioner.

Woodburn.—Blaine McCord, street commissioner.

Beaverton.—W. O. Hocken, mayor.

La Grande.—F. J. Lafky, city manager; W. A. Benham, fire chief; R. R. Neal, city engineer; H. Arant, chief of police.

WASHINGTON.

Bellingham.—J. P. Demattos, mayor.

Republic.—J. G. Thompkins, mayor.

Anacortes.—J. M. Morrison, mayor, re-elected.

Blaine.—Wm. Willison, mayor.

Renton.—Thomas Dobson, mayor.

Wenatchie.—Mayor Parr, re-elected.

Puyallup.—Lucien Dean, mayor; J. L. La Plante, city clerk.

Bucoda.—John Graham, mayor.

Port Angeles.—Horace White, mayor.

Orting.—I. G. Harmon, mayor.

Elma.—J. B. Kirkaldie, mayor.

Olympia.—G. A. Mottman, mayor.

Ellensburg.—J. A. Mahan, mayor, re-elected.

Colfax.—J. L. Neil, mayor.

Cheney.—L. C. Van Patten, mayor.

Pullman.—A. E. Shaw, mayor.

Ritzville.—F. B. Shepley mayor.

Palouse.—G. T. Boyd, mayor.

Tekoa.—Edward Schmidt, mayor.

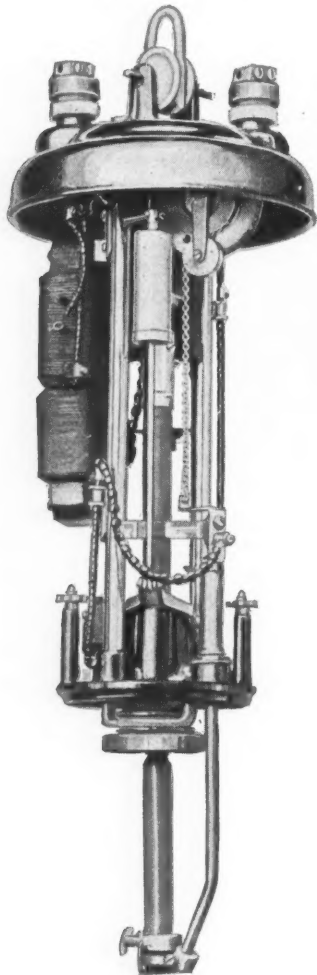
Colville.—J. C. Jesseph, mayor.

NEW APPLIANCES

TYPE W FLAME ARC. Furnishes Large Quantity of Light at Minimum Expense.

The General Electric Type W, multiple flame arc lamp is made for use on alternating and direct current circuits of nominally 110 volts, and also for power circuit service.

The alternating current lamps are arranged for operating at 10 amperes at the arc. They take 7.5 amperes at the



MECHANISM OF A. C. LAMP.

terminals and are fitted with an internal compensator which has a primary of 7.5 and a secondary of 10 amperes as the high current and low voltage (45 to 50 at the arc) give the best general results.

The direct current and power circuit lamps operate at 6.5 amperes.

The mechanism of the power circuit lamps is like that of the direct current multiple lamp with the addition of a regulating weight to properly balance the arc voltages when two or more lamps are burning in multiple series.

All types of this lamp are similar in external appearance and 80 per cent. of the parts are interchangeable. It is the shortest long life flame arc lamp on the

market, being only 32 in. long. The extreme diameter of the condensing chamber is 16 in., giving a large cooling surface for the condensation of the fumes.

The ventilating arrangement is quite similar to that used in the Type K lamps; that is, a large chamber is provided in which the fumes are condensed and deposited. This keeps the inner globe so free from fumes that the illumination remains the same throughout the trim. Slabs of absorbent material are placed in the condensing chamber to prevent etching of the globes by the fluorine in the fumes.

The carbons burn from 100 to 200 hours and the stub of the upper carbon can be used in the lower holder after each trim, thereby making necessary the renewal of only one carbon.

The clutch does not operate directly on the carbons, but works on the inner, machined surface of the roller bearing over which passes the chain connecting the upper carbon holder and the lower carbon holder rod. It is extremely sensitive and positive in its action.

The lamps are focusing, therefore the arc is always in the same position.

The focusing rod which carries the lower carbon holder is suspended in a very unique manner. In order to eliminate all friction the center of gravity of this complete part was first located and the entire rod and carbon holder suspended from this point. This feature assists regulation by the elimination of friction.

The upper carbon holder is very simple and effective and can be easily removed. It will tightly hold carbons even though there is a considerable variation in diameter.

The carbons strike together with great force before starting, effectually crushing any slag which might be on the electrodes.

Losses from eddy currents in the magnets are reduced to a minimum. The economizer is so designed that a maximum amount of heat is radiated. The blow ring is placed around the economizer and eliminates all tendency of the upper carbon to burn off at an angle. The gas cap is very simple and can be removed with ease.

One feature of these lamps is the accessibility of all parts.

The casing is copper, is telescopic and has a bayonet joint keeping it in position, and a lock screw which positively retains it. The casing is weather-proof and insect-proof.

The outer globe is held by a simple arrangement of flexible corrugated phosphor bronze strips. No tools are necessary in removing or replacing a globe. To lower the outer globe it is simply necessary to give the lock a half-turn.

The bail for the inner globe is formed

into a spring which presses the globe against a machined seat.

The trimming operation is simple and can be accomplished in a very short time. The globes and condensing chamber can be removed at one operation without necessitating the removal of the casing.

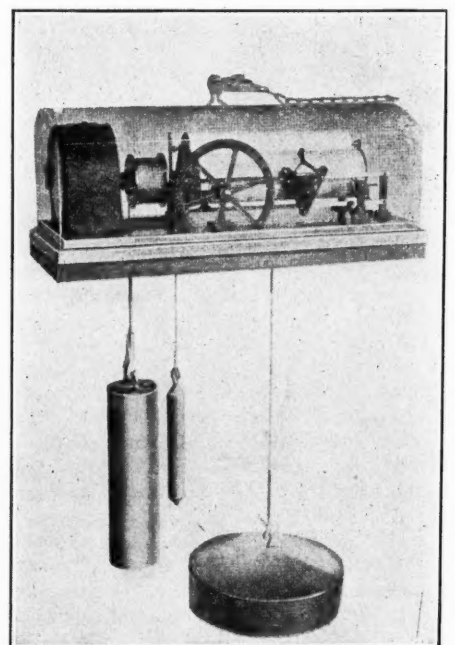
The standard glassware equipment is a clear inner globe with a light alabaster outer globe, but any desired combination of globes will be furnished.

STEVENS RECORDER. Makes Graphic Record of Stage of Water Continuously for Two Months.

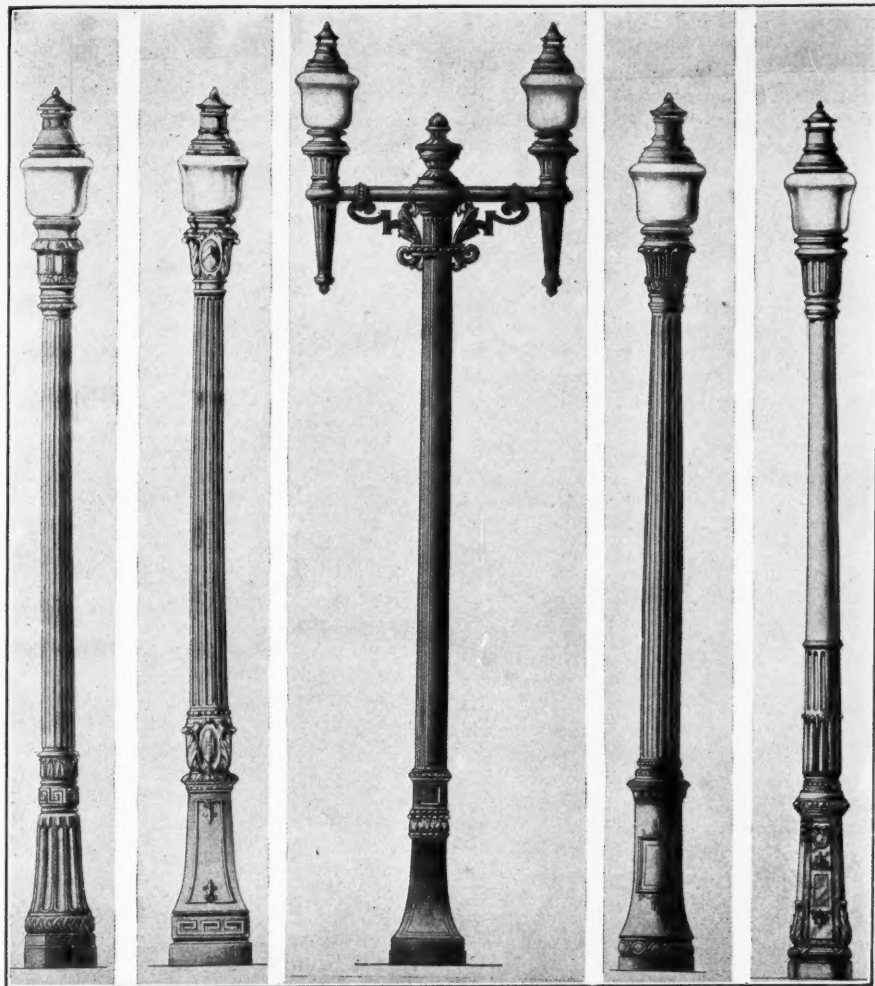
The Stevens Continuous Water Stage Recorder, designed by J. C. Stevens, hydraulic engineer, Portland, Ore., has been placed on the market by Leopold & Voelpel, manufacturers of scientific instruments, 107 East 70th street, North, Portland, Ore. The mechanism is exceedingly simple. A power weight drives the record paper and a speed regulating clock at the same time. The rate of travel of the paper is one-tenth inch per hour.

A counterpoised float moves a marking pencil at right angles to the direction of motion of the record paper, thus producing a graphical representation of the rise and fall of water to any desired scale. Unless otherwise specified, the scale used is one inch of record per foot of rise.

Whenever the pencil reaches the margin of the paper, its direction is suddenly reversed, and it continues to record as before, but in an opposite direction. Thus a rise (or fall) of any magnitude is accurately recorded to a uniform scale, and a record that otherwise would be unwieldy is condensed



STEVENS RECORDER.



DESIGNS OF LAMP STANDARDS MADE BY LUDIN ELECTRIC AND MACHINE CO., BOSTON, MASS.

onto a strip of paper 11 inches in width.

The record paper is ruled similar to the ordinary cross-section, tracing paper, and is furnished in 25-yard rolls, one roll being sufficient for a year's record.

The Recorder will run as long as there is space to permit movement of the power weight. Such an instrument should always be placed on top of a stilling box. This weight and the float with its counterpoise will move in the same stilling box without interference. In this manner it is usually possible to install the instrument to run for two months without rewinding, and if desirable it can be installed to run for a much longer time—a year if necessary.

The Seth Thomas clock movement is enclosed in an absolutely dust-proof case, and the whole is contained in an outside cover that prevents wetting the interior either by rainfall or by being submerged. The size of the base is 10x22 inches, and the cover is 8 inches high. The instrument with weights and float weighs 80 pounds packed for shipment.

PISTON HEAD.

Of New Type for Use in Connection With Water Pumps.

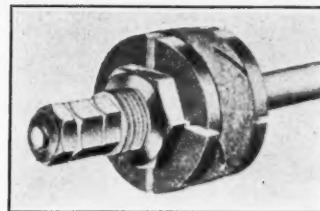
The Codd Tank & Specialty Company, 406 West Camden street, Balti-

more, Md., have placed on the market a piston head in which the packing may be readily expanded to produce the necessary fit against the inner cylinder wall to prevent leakage and also to compensate for wear from time to time.

The piston head, which is supported by a rod of any of the customary types, has an annular flange which is concentric with the rod. This flange has a number of passages for the reception of stems formed on or carried by curved followers. The whole arrangement being substantially that of a cylinder, upon the outer circumference of which the packing rings are applied. The followers are forced radially outward to bring the packing rings into engagement, with the inner wall of the cylinder. The inner ends of the follower stems are tapered and

threaded to receive a threaded taper sleeve that is slipped over an extension of the piston rod.

In use when it is desired to overcome leakage or to compensate for the wear of the packing from time to time, the sleeve is turned and forces the followers radially outward to expand the rings. The end of the piston rod is threaded to receive a series of lock nuts, to keep the packing in any desired position and guard against acci-



PISTON HEAD.

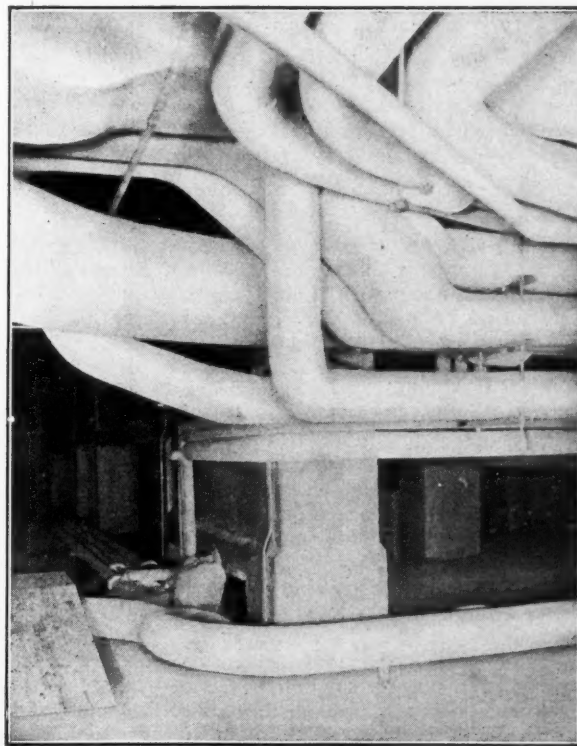
dental displacement and also furnish a means of easy readjustment at any time this becomes necessary.

ASBESTOS.

Twenty-seven Carloads of Pipe Covering for New York's Municipal Building.

By the end of the year the most costly municipal building in the world will be completed, and New York will have established another high water mark in the raising of colossal structures. So enormous is New York's new home for its municipal offices that the quantity of material used in its construction reaches stupendous figures.

The ordinary visitor, for instance, would not guess that one contract alone for covering the vast maze of



HIGH PRESSURE STEAM AND COLD WATER PIPES IN MUNICIPAL BUILDING, NEW YORK.

pipes which thread this building involves 27 carloads of pipe covering material.

The various lines covered include steam, hot water, ventilating, cold water and ice water for drinking purposes.

Particular attention is called to the group of pipes on the mezzanine floor, a picture of which is reproduced herewith. On account of the restricted space and the number of bends, the work of covering these pipes presented unusual difficulties which required the utmost skill and patience to overcome.

This contract was awarded to the H. W. Johns-Manville Co., New York.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago.—No tonnage of importance has been booked. Quotations: 4-inch, \$27; 6 to 12-inch, \$25; 16-inch and up, \$24. Birmingham.—No recent orders of any size have been received. Plants are working from 3 to 5 days a week. Quotations: 4-inch, \$22; 6-inch and up, \$20. New York.—Some inquiry is being received for spring delivery. Quotations: 6-inch, \$22 to \$23.

Lead.—Market is more active. Some large orders have been placed. Quotations: New York, 4c.; St. Louis, 3.85.

Gravity Filtration.—The Gravity Filter catalogue, recently published, of The New York Jewell Filtration Company, explains the several types of gravity filters of their manufacture and gives a general idea of the conditions to which they are suited. These are: New York Sectional Wash Gravity Filter, Continental Gravity Filter, Modified Jewell Filter, Jewell Gravity Filter, High-type Jewell Gravity Filter, Low-type Jewell Filter, Warren Gravity Filter. Each of these is given a page illustration. Plans and elevations of typical installation occupy two pages. Illustrations of actual installation and data obtained from them occupy the rest of the book.

Curtis Steam Turbines.—Bulletin No. A4137, recently issued by the General Electric Company, illustrates and describes that company's Curtis Steam Turbines of 100 to 2,500 KW. capacity, for driving 60-cycle generators at 3,600 R. P. M. These generating sets are of the horizontal shaft rigid frame type, and either two or four impulse wheels are used, depending upon the capacity of the generator. These sets include all the latest development in the Curtis Steam Turbine, and represent the most advanced stage in turbo-generator construction. The shaft packing is steam sealed and is capable of maintaining a high vacuum indefinitely. The governor is of the centrifugal-inertia type and controls the valves through a relay which relieves the governor of the necessity of supplying the power to operate the valves. The steam admission valves operate in sequence, and do not throttle or wire-draw the

steam. As an added factor of safety an emergency governor is supplied, which is entirely independent of the steam regulating governor. The bulletin is well illustrated, showing details of turbine construction, path of steam flow, and a number of typical installations.

Contractor's Equipment.—E. B. Leaf Company, Harrisburg, Pa., has purchased from B. B. Odell, Jr., of Newburgh, practically all of the equipment used by the Thos. McNally Company in the construction of their contract of the New York aqueduct carrying the water from the Catskill Mountains to New York City.

This equipment consists of about three or four hundred pieces of contractor's equipment, consisting of steam shovel, crushers, hoisting engines, travelling crane, cars, concrete mixers, pipe lines, air compressors and other like material.

Renewable Seat Valves.—The Fairbanks Co., 416 Broome street, New York City, have devised a renewable seating feature for their iron body and brass body gate valves. The renewable seat ring is made of bronze and held in the body casting by specially constructed cut threads and locked in place similar to a gun breach block. The seats can be changed by use of a wrench. The seat rings engage with the bronze face of a double-taper solid wedge and pressure may be applied to either side of the valve.

Fire Department Repair Shop.—The fire department of Racine, Wis., will soon be in the market for a small list of miscellaneous tools and supplies for its new repair and machine shop. The list includes a 16x19 lathe, 24-in. drill press, bench vise, milling machine and shaper, dies, forge, anvil and complete set of wood and metal-working hand tools. James Cape is fire marshal.

Highway Engineering.—From January 19th to January 31st the Department of Civil Engineering, Case School of Applied Science, Cleveland, Ohio, will offer a course in highway construction for engineers, contractors, inspectors, prospective applicants for positions in the state highway service and any others who may be interested in this line of work.

The course will be given in the form of forenoon lectures covering general highway economics, the various types of highways, their construction and maintenance; afternoon lectures and laboratory work in the materials of construction including cement, concrete, paving brick, crushed stone and other materials, and conferences for the discussion of costs and methods of construction and maintenance. Additional lectures will be given on the subject of culverts and bridges. Lectures and laboratory work will be given by Maurice B. Greenough, Instructor in Civil Engineering, Case School of Applied Science, with additional lectures by James R. Marker, State Highway Commissioner of Ohio,

and other specialists in Highway Engineering. The course has the co-operation of the State Highway Commission. There are no entrance requirements and no fees to be paid for the course. Inquiries for further information should be addressed to Maurice B. Greenough, Case School of Applied Science, Cleveland, Ohio.

Knight Sleeve Motor.—John North Willys, owner of the Willys-Overland Company, the Willys utility truck, and the Garford pleasure car and truck, has purchased from the Edwards-Knight people, of New York State, their complete factory equipment, and the right to use the Knight sleeve motor. This he has transferred to Elyria, O., and in future will manufacture what will be known as the Willys-Knight six and four-cylinder motors. Mr. Edwards will go with Mr. Willys as designing engineer of these two cars.

Koehring Reunion.—The Eastern offices of the Koehring Machine Company held a reunion in Philadelphia, December 10, 11 and 12. The following agents were present: G. E. Hillsman, Chicago, Ill.; W. W. Williams, Columbus, Ohio; O. M. Twitchell, Philadelphia, Pa.; C. T. Topping, Pittsburgh, Pa.; F. O. Johnson, Boston, Mass.; Lee T. Ward, Philadelphia, Pa.; H. B. Trevor, Rochester, N. Y.; T. M. Brown, Baltimore, Md.; W. W. Bucher, New York, N. Y.; R. E. Brooks, New York, N. Y., and P. A. Koehring of the home office, Milwaukee, Wis.

At a banquet held at the Engineers' Club on the evening of the 10th, the discussion was critical in its nature. Suggestions by Koehring mixer users were brought up and thoroughly discussed. It is the aim of the Koehring Company to embody in its equipment any suggestions which will either reduce labor costs for the contractors, improve the operation of the machine, lessen the labor of the operator or tend to lengthen the life of the equipment.

Another banquet was held on the evening of the 11th at the Vendig Hotel. Mr. Ward of the Lee T. Ward Company, the Philadelphia representatives, spoke on the "Loss of an Order." Mr. Hillsman of Chicago spoke interestingly on "Service." "The Relationship of the Salesman to the Home Office" was the subject of the address given by Mr. Twitchell, also of Philadelphia. C. T. Topping of Pittsburgh gave some suggestions on the proper "Handling of Shipments." H. B. Trevor of Rochester spoke on "Some Methods of Getting Orders." Co-operation was the subject of the address of R. E. Brooks, the New York City representative of the Koehring Company. W. W. Williams of Columbus, Ohio, after an instructive talk on "Sincerity," presented Philip Koehring with a loving cup, a spontaneous expression of esteem from his agents. Mr. Koehring responded with a most interesting review of the history of the Koehring Company, telling how, in six years the plant has grown from a very small shop to the largest concrete mixer factory in the world.

ADVANCE CONTRACT NEWS

ADVANCED INFORMATION BIDS ASKED FOR

CONTRACTS AWARDED ITEMIZED PRICES

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS				
Fla., Bartow	Dec.	29..	Concrete sidewalk, 25,000 sq. yds.	B. J. Oeland, City Clk
Fla., Tarpon Springs	Dec.	29..	Hard surfaced highway	L. D. Vinson, Co. Comr.
Cal., Oakland	Dec.	29..	Tunnel and highway; estimated cost, \$250,000	City Council.
Wash., Olympia	2 p.m., Dec.	29..	Clearing, grading, draining, bridging, 4 miles highway	W. J. Roberts, Sec. Hy. Bd.
Ind., South Bend	11 a.m., Dec.	29..	Road construction	Comrs.
O., Youngstown	Dec.	29..	Grading and macadamizing	Hazeltine & Montgomery, Eng.
Pa., Balston	Dec.	29..	Highway improvement, 2 1/2 miles	Bd. Supvs.
O., Coitesville	2 p.m., Dec.	29..	Grading, macadamizing or paving number of streets	Twp. Clk.
N. Y., New York	2.30 p.m., Dec.	30..	Cement sidewalks and steps	M. J. Drummond Comr. Pub. Charities.
Wis., Green Bay	11 a.m., Dec.	30..	Road machinery	Brown Co. Bd. Supvs.
Del., Wilmington	noon, Dec.	30..	Building two improved roads	Jas. Wilson, St. Hwy. Comn.
Pa., Pittsburgh	noon, Dec.	30..	Filling and paving approaches to bridge	R. J. Cunningham, Co. Cont.
Va., Roanoke	Dec.	30..	Macadamizing street	F. L. Gibboney, City Engr.
Ill., Chicago	11 a.m., Dec.	30..	6-ft. cinder sidewalk, for several streets	G. A. Schilling, Pres. Bd. Loc. Imp.
Ind., Portland	Dec.	31..	Road improvement	Comrs.
N. C., Wilmington	noon, Dec.	31..	Concrete curb, 14,500 lin. ft.; conc. sidewalk, 5,000 sq. yds.	Rapalje & Loughlin, Engrs.
O., Sallina	Jan.	1..	Macadam, 3 miles	R. D. Smalley, Co. Engr.
Tex., Mexia	Jan.	1..	Paving, cost \$80,000	H. S. Bennet, City Engr.
La., Waukon	7 p.m., Jan.	2..	Vit. brick pavement, 21,000 sq. yds.	J. D. Cowan, City Clk.
La., New Orleans	noon, Jan.	3..	Main public highway	W. E. Atkinson, St. Hwy. Cmr.
Wash., Kelso	Jan.	5..	Highway construction; cost, \$73,880	Cowlitz Co. Comrs.
Ind., Huntington	Jan.	5..	Five gravel roads	H. Guthrie, Co. Aud.
Ind., Jeffersonville	Jan.	5..	Gravel road	G. W. Stover, Aud.
Ind., Danville	Jan.	5..	Highway	L. W. Borders, Co. Aud.
La., Pointe La Hache	Jan.	5..	Constructing main highway	Hway Dept., New Orleans
Ind., Hartford City	2 p.m., Jan.	5..	Macadam road	Co. Aud.
Ind., Valparaiso	2 p.m., Jan.	5..	Gravel road	Comrs.
Ind., Rensselaer	2 p.m., Jan.	5..	Macadam road	Comrs.
Ind., Fowler	1 p.m., Jan.	5..	Roads in seven townships	Comrs.
Ind., Williamsport	2 p.m., Jan.	5..	Highway construction	Co. Comrs.
Ind., Vevay	1 p.m., Jan.	5..	Highway construction	Co. Comrs.
La., Belle Plain	3 p.m., Jan.	5..	Paving, 55,718 sq. yds.; cement curb, 13,570 ft.	W. M. Ewen, City Clk.
Ind., Portland	Jan.	5..	Gravel road	Comrs.
Fla., Clearwater	Jan.	5..	Hard surfaced highway	C. W. Weickling, Clk.
Miss., Kosciusko	Jan.	6..	Road improvement, 17 miles, gravel or crushed stone	W. B. Potts, Pres.
Ind., Monticello	Jan.	6..	Road construction	A. G. Fisher, Aud.
Fla., St. Augustine	10 a.m., Jan.	6..	Repair and upkeep of hard surfaced roads	W. W. Snow, Co. Aud.
Ind., Crawfordsville	10 a.m., Jan.	6..	Gravel road	Comrs.
Ind., Wabash	1.30 p.m., Jan.	6..	Gravel road improvements, 2 jobs	Co. Aud.
Ind., Paoli	Jan.	6..	Road, 9,774 feet	E. A. Palmer, Co. Aud.
Ind., Vincennes	Jan.	6..	Gravel road	J. T. Scott, Aud.
Ind., Delphi	Jan.	6..	Constructing road	M. G. Haun, Aud.
Ind., Madison	Jan.	6..	Gravel road	A. M. Taff, Aud.
O., Columbus	2 p.m., Jan.	6..	Grading and paving with waterbound macadam; bridges and culverts; est. cost, \$15,298.80. Grading and paving with brick; est. cost, \$16,407.52. Paving with waterbound macadam; est. cost, \$25,355.	J. R. Marker, St. Hwy. Comr.
O., Cleveland Hgts.	noon, Jan.	6..	Grading streets	H. H. Canfield, Vil. Clk.
O., Marion	Jan.	6..	Constructing road	Co. Comrs.
Ind., Shelbyville	10 a.m., Jan.	7..	Road	Comrs.
Ind., Portland	Jan.	7..	Construction of two roads	Comrs.
Ga., Savannah	Jan.	8..	Furnishing cement gravel, 10,000 cu. yds.	Co. Comrs.
Fla., St. Petersburg	Jan.	19..	Grading, curbing and paving	Bd. Comrs.
Mont., Billings	Jan.	20..	Paving	City Clerk.
Fla., St. Petersburg	Jan.	26..	Paving, vit. block; curbing with granite, 75,000 feet	Bd. City Comrs.
O., Sallina	Feb.	1..	Macadam, 4 miles	R. D. Smalley, Co. Engr.
Ind., Laporte	Feb.	2..	Brick paving; cost, \$800	L. Drew, Engr.
SEWERAGE				
Ind., Wayne	11 a.m., Dec.	27..	Tile drain	Bd. of Comrs.
N. Y., Kings Park	3 p.m., Dec.	29..	Hot water circulation system	St. Hosp. Comn., Albany.
Kans., Concordia	8 p.m., Dec.	29..	Sanitary sewers, including 21,165 lin. ft. 8-15-in. vit. pipe	L. W. Lash, City Clk.
N. J., Bogota	8 p.m., Dec.	30..	Vit. sewers, 4.4 miles; branches, manholes, etc.	H. P. Ross, Boro. Clk.
N. Y., Rochester	11 a.m., Dec.	30..	Sewer in Woodbine Ave.	F. X. Pifer, Sec.
La., Muscatine	Dec.	30..	Drainage pumping plant	Co. Aud.
S. C., Columbia	Dec.	30..	Sewer extension	W. F. Stieglitz, Water Comr.
Miss., Indianola	11 a.m., Dec.	30..	Drainage improvements	J. Stein, Supv. Engr.
Minn., Fairmont	Dec.	30..	Ditch work	H. C. Nolte, Co. Aud.
Miss., Duncan	Jan.	1..	Surface drainage	W. S. Bobo, Engr., Clarksdale.
O., Nelsonville	about Jan.	1..	6 to 14-foot sanitary sewer; estimated cost, \$85,000	Park Sniffon, Engr.
La., Onawa	noon, Jan.	2..	Three main drains	J. P. Olander, Co. Aud.
La., Adel	Jan.	5..	Sewer including 1,320 ft. 8-inch pipe	V. T. Sweeley, City Clk.
Kans., Arma	1 p.m., Jan.	5..	Constructing waterworks, including material and labor	City Clerk.
Kans., Atchison	Jan.	5..	Tile sanitary sewer, 4,100 ft.	F. S. Altman, City Engr.
La., New Orleans	Jan.	6..	Pumps, 1 centrifugal, 11 screw; discharge pipes, gates, &c.	G. C. Earl, Gen. Supt.
N. J., Newark	2 p.m., Jan.	6..	Main intercepting sewer	J. S. Gibson, Clk.
Miss., New Albany	8 p.m., Jan.	6..	General sewerage system	S. W. Beville, City Clk.
Ark., Newport	Jan.	6..	Dredge ditches, 30 miles; drainage and excavations	Jones & Campbell.
La., New Orleans	Jan.	30..	Drainage canal work	F. S. Shields, Sec. Sew. Bd.
Neb., Scottsbluff	Feb.	3..	8 to 10-in. pipe sewers and gravity sewage disposal plant, estimated cost, \$22,000	G. L. Shumway, City Clerk
Wis., Fond du Lac	Feb.	15..	Vit. pipe sewer, 1 1/2 miles, 8 to 18-inch	J. F. Hohensee, City Clk.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
WATER SUPPLY				
N. Y.	Mount Morris	2 p.m., Dec.	29.. Supply main and reservoir	J. Aubery, Vil. Clk.
N. Y.	Ogdenburg	3 p.m., Dec.	29.. Water softening plant	State Hosp. Comm., Albany.
Fla.	Pensacola	2 p.m., Dec.	29.. Air compressor	A. Greenhut, Mayor.
Md.	Hancock	Dec.	29.. Reservoir and pump house, laying mains	R. J. McCandlish, City Treas.
N. Y.	New York	Dec.	30.. Reservoir and aqueduct apparatus	Bd. Water Sup.
S. C.	Columbia	Dec.	30.. Water main	W. F. Stieglitz, Water Comr.
Kans.	Scott City	Dec.	30.. Sinking well, installing pump and engine	State Bd. Irig.
N. Y.	Williamson	Jan.	1.. Water works, cost \$70,000	H. C. Kittredge, Engr., Roch- ester.
Kans.	Lakin	Jan.	1.. Digging of artesian well	Kearney Co. Comrs.
Ind.	Mitchell	About Jan.	1.. Water and electric light plant	A. H. Kennedy, Rockport.
La.	New Orleans	noon, Jan.	6.. Pumps and other water supplies	F. S. Shields, Sec. Sew. & Wat. Bd.
Ill.	Winchester	7.30 p.m., Jan.	6.. Waterworks system	Fuller Coult Co., Engrs., St. Louis, Mo.
Mont.	Columbus	Jan.	12.. Water works	G. A. Westover, Twn. Clk.
la.	Winfield	About Jan.	15.. Water system	J. O. Kilbourne, City Clk.
Neb.	Fremont	Jan.	15.. Water works	G. G. Bruckert, Vil. Clk.
Pa.	Gettysville	8 p.m., Jan.	15.. Reinforced concrete dam and reservoir, sand filter plant and conduit, 13,900 ft.	A. Carmichael, Pres. Council
Can.	Toronto	noon, Jan.	20.. Filtration plant	H. C. Hocken, Mayor
Minn.	Wabasha	Jan.	27.. Complete water works system	J. M. Schouweiler, City Rec.
LIGHTING AND POWER				
D. C.	Washington	Dec.	27.. Conduit & lighting fixtures, Post Office, Macomb, Ill.	Supv. Arch.
Ind.	Indianapolis	10 a.m., Dec.	29.. Lighting and heating Soldiers' Monument	G. B. Menzies, Pres.
Pa.	Philadelphia	Dec.	29.. Steam turbine generator, with exciter, switchboard, etc.	Com. Officer, Frankfort Ars'l.
Conn.	Hartford	Dec.	30.. Installing hydraulic plunger lift	O. Wenderoth, Supv. Arch., Wash., D. C.
N. Y.	New York	Dec.	30.. Furnishing and delivering electrical power; annual light- ing contract 1 year	H. S. Thompson, Comr. W. S. Dir. Pub. Serv.
O.	Cleveland	Dec.	30.. Steam driven turbine exciter	Comr. Water Supply.
N. Y.	Brooklyn	2 p.m., Dec.	30.. Furnishing power (electrical) furnishing and maintain- ing electric lamps; furnishing gas, lamps, etc.	Engr. of Constrn., City Hall. Bur. of Supplies, Navy Dept.
O.	Cleveland	Dec.	30.. Steam turbine driven exciter	Co. Comrs.
D. C.	Washington	Dec.	30.. Electric furnaces	E. L. Tustin, Recorder.
Pa.	Allentown	10 a.m., Dec.	31.. Pump and motor	T. L. Trumbull, Cons. Engr.
Pa.	Philadelphia	noon, Dec.	31.. Electric light fixtures, etc.	A. H. Kennedy, Rockport.
Can.	Calgary	5 p.m., Dec.	31.. 200 k.w. traction motor generator, switchboard, etc.	C. H. Johnson, Arch., St. Paul.
Ind.	Mitchell	About Jan.	1.. Electric light plant	Supv. Arch.
Minn.	Walker	2 p.m., Jan.	2.. Power plant	City Clerk.
D. C.	Washington	3 p.m., Jan.	2.. Lighting fixtures, etc., at Brigham City, Utah	Town Council.
Kans.	Arma	1 p.m., Jan.	5.. Electric lighting plant	Clk. Bd. Trustees.
Va.	Boyce	Jan.	5.. Franchise to install electric system	Maj. W. L. Clarke, Sig. Corps, U. S. A.
Cal.	Alviso	Jan.	5.. Franchise to erect transmission lines	J. J. Carroll, City Clk.
D. C.	Washington	Jan.	5.. Telephone and electrical supplies	Chief Clk., Dent. Interior.
Kans.	Neodesha	8 p.m., Jan.	7.. Engine type alternator with exciter, etc.	R. C. Desrochers, Dept. Pub. Wks.
D. C.	Washington	Jan.	9.. Remodeling power plant	G. G. Bruckert, Vil. Clk.
Can.	Ottawa	Dec.	15.. Gutta percha cable	Supv. Arch.
Neb.	Bruning	Jan.	15.. Lighting plant	Co. Comrs.
D. C.	Washington	Jan.	19.. Electric conduit, wiring and interior lighting fixtures	G. G. Earl, Gen. Supt.
Ga.	Atlanta	Jan.	20.. Lighting fixtures and lamps	
La.	New Orleans	noon, Jan.	30.. Electrical machinery, drainage canal work	
FIRE EQUIPMENT				
Kans.	Topeka	Dec.	29.. Erecting new station	City Comrs.
N. Y.	New York	3 p.m., Dec.	29.. Fire alarm system in hospital	State Hosp. Comm., Albany.
BRIDGES				
Va.	Amherst	noon, Dec.	29.. Erecting bridge, 70-ft. span	Clk. of Circuit Court.
Va.	Rocky Mount	Dec.	29.. Concrete bridge, 71 ft. 9 ins. long	Clk. Circuit Court.
Mo.	Joplin	Dec.	30.. Concrete viaduct	W. T. Brooks, Engr, Kansas City.
O.	Hamilton	Jan.	1.. Concrete or steel bridge, 650-ft. span	F. Hemmerl, Engr.
O.	Columbus	noon, Jan.	2.. Constructing bridge	Bd. Co. Comrs.
W. Va.	Louisville	Jan.	5.. Reinforced concrete arch bridge, 100-ft. span	Co. Court.
Ind.	Goshen	Jan.	5.. Bridge, 300-ft. span, concrete pier and abutment	Co. Comrs.
Miss.	Kosciusko	Jan.	5.. Bridges and culverts, probably concrete	Highway Comrs.
S. D.	Desmet	1 p.m., Jan.	5.. Steel or reinforced concrete bridges	W. M. Look, Co. Aud.
S. D.	Woonsocket	noon, Jan.	6.. Steel and concrete bridges for 1914	J. Kingsburg, Co. Aud.
S. D.	Aberdeen	Jan.	6.. Six bridges	Co. Comrs.
S. D.	Canton	Noon, Jan.	7.. Bridges and culverts during 1914	T. O. Torbison, Aud.
Iowa	Charles City	noon, Jan.	7.. Bridges and culverts	H. B. Rosencranz, Co. Aud.
Miss.	Batesville	Jan.	7.. Reinforced concrete bridge	J. B. Carothers, Clk.
Fla.	St. Augustine	noon, Jan.	7.. Reinforced concrete bridge	City Clk.
S. D.	Clear Lake	2 p.m., Jan.	8.. Steel and concrete bridges	A. L. Larsen, Co. Aud.
MISCELLANEOUS				
Can.	Toronto	Dec.	27.. Water proofing eight subways	B. Ripley, Engr.
Ill.	Chicago	11 a.m., Dec.	27.. Gate valves	L. E. McGann, Comr. P. Wks.
Pa.	Harrisburg	3 p.m., Dec.	29.. Ash and refuse collection, 4 years	Supv. Pub. Safety.
Ill.	Chicago	11 a.m., Dec.	29.. Removing ashes and refuse	L. E. McGann, Comr. P. Wks.
Ill.	Chicago	Dec.	29.. Oil fuel	L. E. McGann, Comr. P. Wks.
Can.	Ottawa	4 p.m., Dec.	29.. Constructing dam	R. C. Desroches, Sec. D. P. W.
N. Y.	Poughkeepsie	3 p.m., Dec.	29.. Coal and ash handling apparatus	J. H. E. Hanify, Sec., Albany.
N. Y.	New York	Dec.	29.. Subway	Pub. Serv. Comm.
Can.	Vancouver	Dec.	29.. Erecting hospital	R. C. Desroches, Ottawa.
Ill.	Chicago	2 p.m., Dec.	29.. Rubber tires, inner tubes, etc.	Gen. Supt. Police, City Hall.
Cal.	Richmond	Dec.	29.. Harbor work	City Clerk.
D. C.	Washington	10.30 a.m., Dec.	30.. Galvanized conduit, copper condenser tubes & chemicals	Maj. F. C. Boggs, G. Pur. Off.
Cal.	Mare Island	10 a.m., Dec.	30.. Brass and copper pipe and tubing	P. J. Cowie, Paym. Genl. U. S. N., Washington.
Kans.	Topeka	Dec.	30.. Irrigation system, cost about \$5,000	H. B. Walker, Engr., Manhat.
Ill.	Chicago	Dec.	30.. Furnishing breeching and draft apparatus	L. E. McGann, Comr. P. Serv.
Ill.	Chicago	Dec.	31.. Hydrant and valve castings	L. E. McGann, Comr. P. Wks.
Ky.	Taylorsville	Dec.	31.. Fireproof court house	S. K. Baird, Co. Judge.
O.	Cleveland	Jan.	1.. Four-story hospital, cost \$150,000	Trus. St. John's Hospital.
Ill.	Chicago	11 a.m., Jan.	2.. Furnish and deliver fire brick	L. E. McGann, Comr. P. Wks.
Ill.	Chicago	11 a.m., Jan.	3.. Lubricating oil	L. E. McGann, Comr. P. Wks.
Ill.	Chicago	noon, Jan.	5.. Rapid transit subways	E. Block, Ch. Trans. Com.
Can.	Megantic, Ont.	Jan.	5.. Concrete dam	J. Ray, Clk.
D. C.	Washington	11.30 a.m., Jan.	5.. Bells, fuses, telephone condensers, etc.	Maj. W. L. Clark, Dis. Off., U. S. A.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
S. D.	Flandreau	.....2 p.m., Jan.	6..Court house	G. A. Chorpeneing, Co Aud
Colo.	Grand Junction	.....3 p.m., Jan.	6..U. S. Post Office	O. Wenderoth, Washington, D. C.
Miss.	Pass Christian	.....Jan.	6..Shell crusher	City Council.
O.	Salem	.....3 p.m., Jan.	7..U. S. Post Office	O. Wenderoth, Supv. Arch., Washington, D. C.
Can.	Ottawa	.....Jan.	8..Heating and ventilating post office building	R. C. Desroches, Sec. D. P. W.
O.	Springfield	.....Jan.	10..County infirmary, cost \$95,000	Co. Comrs.
Il.	T. Pearl Harbor	.....Jan.	13..10,000 bbls. of cement	Navy Payoffice, Seattle, Wash.
O.	Bellaire	.....Jan.	19..Post office	Supv. Arch., Wash., D. C.
Ga.	Atlanta	.....11 a.m., Jan.	20..Metal filing devices, furnishing court room equipment	S. Smith, Ch. Com. Roads.
Va.	Bedford City	.....Jan.	26..Post office	Supv. Arch., Wash., D. C.
Can.	Ottawa	.....4 p.m., Feb.	3..About 85 miles welded steel pipe	City Clerk.

STREETS AND ROADS

Fort Smith, Ark.—Paving of South Sixth St. has been planned.

Bisbee, Ariz.—Contract will shortly be let for construction of road 2½ miles long between Bisbee and Warren, at cost of about \$30,000.

Glendale, Ariz.—Town Council has decided to have following streets graded and put in first class shape: Lincoln St. from First Ave. to the high school grounds and Peach St. north from Washington city limits.

Phoenix, Ariz.—The advisory board that is looking into matter of location of good roads that are to network county of Maricopa when proposed bond issue shall have been carried, has decided upon advice of many of farmers of valley to increase issue to be voted upon from \$1,250,000 to \$1,500,000, in order that no detail of adequate road construction shall be left undone. Main backbone roads are to be built in such permanent fashion that they will be adequate in all that word implies.

Calexico, Cal.—Trustees of Calexico have commissioned I. B. Funk, City Engineer, Imperial, to prepare plans for various road improvements. Estimated cost, \$100,000.

Oakland, Cal.—Plans and specifications for improving 26th St., between Broadway and Telegraph Ave., have been adopted.

Pasadena, Cal.—Resolution has been adopted for improvement of Madeline Dr., between Orange Grove Ave. and Pasadena Ave.

Pomona, Cal.—A boulevard from Pomona to mouth of San Antonio canyon is assured. Route of proposed road has been outlined as extension of Mills Ave., which runs along east side of Blanchard Park, where Alumni athletic field is located, due north through old Martin place, through Fairchild place.

Redwood City, Cal.—Board of Supervisors has sold \$500,000 worth of county highway bonds to W. R. Staats Co., of San Francisco, for accrued interest and good premium. This makes \$852,000 of \$1,250,000 bond issue for good roads that are now in hands of bond buyers. Next work will be on Middlefield road from Redwood City to Palo Alto and grading of boulevard from Colma over mountains to coast side. Sale of \$500,000 worth of bonds assures work in all parts of county next summer on 108-mile system of boulevards.

San Francisco, Cal.—The Market street extension plan, drawn by John M. Punnett, with possible modifications by City Engr.'s office, will be followed. By construction of Twin Peaks tunnel Market St. will be extended from its present terminus at 17th and Castro Sts. to 18th and Hattie Sts., and, as part of tunnel proceedings, its cost between these points will be paid out of tunnel assessments. Proposed plan for further extension will follow contour and easy grade round hill, crossing at Grand View and Ramane Sts., then into Falcon Ave. to Grand View and Corbett Sts. to Sloat Blvd. to beach.

San Francisco, Cal.—Board has recommended improvement of Kansas St. from Army St. southward.

San Francisco, Cal.—E. H. Rollins & Sons and William R. Staats Co. have purchased \$500,000 San Mateo Co. 5 per cent. highway bonds, maturing serially from 1917 to 1942, both inclusive.

Bridgeport, Conn.—Resolutions have been adopted for improvement of various streets.

Shelton, Conn.—It has been learned from good authority that work of extending Huntington Center macadam road, for which Shelton has appropriation of \$25,000, which was partly appropriated by town and rest by State, will begin early in spring.

Jacksonville, Fla.—Bids received for street paving have been referred to Chief Engineer L. D. Smoot and Trustee G. M. Powell for tabulation.

Alton, Ill.—Good roads for farmers is plan of good roads enthusiasts of Bd. of Trade. They have arranged to have Jerseyville road dragged between Alton and Piassa valley and Brighton road will be dragged in bad spots all way from Godfrey to Brighton.

Bloomington, Ill.—City Engineer has estimated cost of paving Lee St. at \$23,052.

Mt. Vernon, Ill.—City is contemplating putting 30,000 to 40,000 sq. yds. of street paving, mostly brick. B. C. Wells is City Engr.

Peoria, Ill.—A Com. of Bd. of Spvs. has prepared to go to Springfield for purpose of conferring with members of State Highway Comm. in connection with improvement of Knoxville road, highway which first will be made a "good road" under state aid law. First good road will be of concrete, probably 12 ft. wide. Money available first year will build only two miles of good road. Each mile will cost from \$8,000 to \$9,000.

Springfield, Ill.—The Jacksonville-Chatham hard road plan of special hard roads committee has been accepted by Sangamon County's Board of Supervisors. Under its provisions, road which is to be extended eventually to Jacksonville will be built next year from Laurel St., in West Grand Ave., south to the Wabash Railroad, passing through West Grand Pl., thence west to the intersection of the Chatham and Southern Jacksonville road. This stretch of 2½ miles of pavement will serve as start toward both Jacksonville and Chatham and will give West Grand Pl. hard road connections with Springfield. Pavement is to be extended 700 ft. south in the Chatham road and 1,500 ft. west in the Jacksonville road. Other highways to be paved with this year's hard road funds are: A mile and a half of the Beards-town road; a mile and a half extension of the pavement in Peoria road; a mile and a half of the Washington St. road, east; a mile and a half extension of the hard road in South 6th St. road, and repair of the present surface.

Peru, Ind.—Bids on proposed improvement of Goodrich St. from 7th to Bayless St., have been opened and read as follows: Bid of Mike Burke: on Metropolitan block \$1.98 per sq. yd. and on Indiana block \$1.88 per sq. yd.; bid of Western Construction Co. of Lafayette on Metropolitan block \$2.05 per sq. yd. Bid of Mike Burke on the proposed improvement of West 6th St.—Metropolitan block \$2 per sq. yd. and on Indiana block \$1.95 per sq. yd. Bid of Grace Constr. Co., \$2.09 per sq. yd. on asphalt and \$1.98 per sq. yd. on bitulithic. Bid of Western Constr. Co. on asphalt \$1.98 per sq. yd. and on bitulithic \$1.85 per sq. yd.

Washington, Ind.—Seventy-four residents of Washington Twp. have petitioned Co. Comrs. for improvement of road, commencing at northwest corner of southeast quarter, section 29, and running 2½ miles west to township line between Washington Twp. in Delaware Co. and Van Buren Twp. in Madison Co. It is asked that highway be made 30 ft. wide at all points and that road grade be 20 ft. and that gravel grade be 12 ft. wide.

Carroll, Ia.—Paving of several streets in residence district is being urged.

Dubuque, Ia.—Board of Supervisors will spend \$60,000 for improving 25 miles of highways in Hawkeye County.

Lawrence, Kan.—Construction of boulevard drive is recommended by Mayor.

Topeka, Kan.—Grading and paving of alleys between Taylor St. and Western Ave. and 7th St. and 8th Ave. with 20 per cent. vitrified blocks on a 4-in. con-

crete base with asphalt filler have been authorized. C. B. Burge is City Clk.

Lexington, Ky.—Reconstruction of Winslow St. is being planned.

Grand Rapids, Mich.—Good road bonds in sum of \$10,000 have been purchased by city at par from Leach & Co., of Chicago.

Carlstadt, N. J.—Ordinance has been adopted for opening, widening and straightening of Worthington St.

Flemington, N. J.—At meeting of Common Council resolution was passed to call special election for purpose of voting on question of whether or not Frenchtown-Flemington macadam road shall enter borough through Capner St. and connect with Main St.

Pittman, N. J.—Extensive street improvements have been planned.

Albany, N. Y.—Highway bonds in sum of \$21,000,000 will be sold by state during latter part of January.

Pulaski, N. Y.—Preliminary steps have been taken in matter of extending Delano St. to North St.

Syracuse, N. Y.—City Engineer H. C. Allen in his annual report recommends resurfacing of worn out brick pavements.

Akron, O.—Bids will be received at the office of the Auditor of the City of Akron, Ohio, until 12 o'clock noon, January 19, 1914, for the purchase of bonds of city in aggregate sum of \$320,655, of which \$15,400 is for Ridge Ave. paving, \$18,000 for Broad St. paving, \$192,200 and \$24,900 and \$25,500 for Akron street improvement. James McCausland is City Auditor.

Akron, O.—Ordinance has been passed to issue bonds in sum of \$20,000 for purpose of opening and extending Perkins St.

Akron, O.—Ordinance has been passed determining to proceed with improvement of North Case Ave. from East Market St. to Newton St., by grading, curbing, paving, constructing sidewalks, constructing sewer with laterals thereto for house connections, and constructing water service connections.

Canal Dover, O.—County Commissioners in session at New Philadelphia have decided to finish paving of Wooster road between Canal Dover and Strasburg next summer. Plans and specifications will be sent state highways department for approval and work started in spring.

Eaton, O.—Three bond issues aggregating \$4,300 will be sold Dec. 29 by City Council for purpose of securing funds to pay city's portion of 3 street improvements.

Swanton, O.—Paving bonds in sum of \$11,000 have been sold by city.

Urbana, O.—Improvement of Charleston pike, in Clark County, is being planned. Plans outlined call for most extensive road improvement in Clark County in many years. Improved roadway will extend all way from corporation line to Springfield to South Charleston for a distance of approximately 10 miles. While no definite kind of material has been decided upon it is understood commissioners will favor a water-bound macadam.

Zanesville, O.—City Council has voted to pave with brick Woodlawn Ave. and to construct concrete curbs.

Albany, Ore.—A meeting of 9th St. property owners has been held to consider question of paving. A petition for gravel bitulithic had been circulated, and meeting was for purpose of devising means of securing competition on 11 blocks to be paved. Committee was appointed to investigate various pavements and report at meeting to be held in near future.

Astoria, Ore.—City Council is discussing widening of Astor St. at cost of about \$75,000, also widening of Commercial St. 80 ft. more.

Grants Pass, Ore.—On Dec. 31, Josephine Co. will vote upon issuance of \$225,000 road bonds, this having been determined by Co. Court.

Chester, Pa.—Purchase of street repaving outfit is under consideration.

Eddystone, Pa.—Ordinance has been passed increasing bonded indebtedness of Borough of Eddystone, Co. of Delaware, for purpose of improving, paving or macadamizing Saville Ave., in Borough of Eddystone aforesaid from Chester and Darby Tpke. Rd. south to south side of 2d St., and of 9th St. in Borough of Eddystone from Ridley River east to Saville Ave., and for other public purposes, by issue of bonds to amount of \$30,000, that is, from \$10,000 to \$40,000.

Seranton, Pa.—Ordinance has been passed authorizing grading, paving and curbing South Summer Ave. from Washburn St. to Jackson St. in the 5th Ward, and grading, curbing and paving of Centre St., between Washington Ave. and Lee Court, in the 9th Ward.

Nashville, Tenn.—Following is list of ordinances introduced by Commissioner Wilkerson: To pave 22d Ave., from Elliston Pl. to Cedar St. with brick; to pave 4th Ave., from Commerce to Broadway with granite; to pave 4th Ave., from Harrison St. to Jefferson St. with granite blocks; to pave West End Ave., from 21st to 32d St. with bitulithic; to pave 8th Ave., from Gleaves to Bradford, with brick; to pave 1st St., from Oldham to Hancock, with granite; to pave Union St., from 6th to 8th, with bitulithic; to pave 2d Ave., from Church to Broadway, with granite; to pave Parker Ave., from West End to Gladstone, with bituminous macadam; to pave Union St., from 3d to 6th, with wood block; to pave Church St., from 4th to 8th, with wood blocks; to pave 2d Ave., from the public square to Union St., with granite; to pave 10th Ave., from McGavock to Lea Ave., with granite; to pave 5th Ave., from Church to Cedar, with blocks; to pave Hillcrest Ave., from 22d to 23d, with bituminous macadam; to pave 9th Ave., from Church to Broadway, with wood blocks; to pave 4th Ave., from Cedar to Commerce, with wood blocks.

Dallas, Tex.—The Dallas County Commissioners' Court has ordered special election for Jan. 22 upon proposition for county to issue \$125,000 of 5 per cent. gold bonds to pay for cost of paving Dallas-Oak Cliff viaduct with permanent paving material and to build three other bridges over county. Bond issue was fixed at \$125,000 upon estimates of County Engineer Witt, placing cost of viaduct paving at \$79,000 and cost of three bridges at \$44,000. Election date was set for Jan. 22 because city is holding special election on same day.

Dallas, Tex.—Bids have been opened by City Commissioners for paving of six streets whose contracts will involve nearly \$200,000. Six paving concerns made bids on street paving. Six materials are proposed for work. Tabulation will be necessary of various bids on streets, as some of concerns bid on several sorts of materials and on various sizes of wood and vitrified blocks and terms of maintenance. The streets are Lamar, from McKinney to the Katy; Hall, from Knight to Ross; Browder, from Jackson to Pocahontas; Main, from Exposition to Haskell; Laws, from McKinney to Katy; Cochran, from Lamar to Griffin. The bidders are the Standard Engineering & Construction Co., Roach-Manigan Co., Southern Westrumite Co., Creosoted Wood Block Paving Co., Texas Bitulithic Co., Municipal Paving Co.

Galveston, Tex.—County has disposed of \$250,000 issue of bonds for additional roads in Galveston Co.

Sulphur Springs, Tex.—City Comm., on petition of sufficient number of citizens, has ordered election for purpose of voting \$50,000 of bonds for street paving. Election has been ordered for Jan. 10.

Salt Lake City, Utah.—City Engr.'s office has placed before City Comm. maps and notes of preliminary survey of proposed boulevard to be known as Bonneville Highway, which, if constructed, will follow level of prehistoric Lake Bonneville along side of mountains on north, east and south of Salt Lake. Survey and plans will be considered by Comm. within a few days.

Norfolk, Va.—Improving of roadway of Main St. is being planned.

Wheeling, W. Va.—Mayor H. L. Kirk is heartily in favor of disposing of street improvement bonds to Cincinnati firm which has made offer to city authorities.

Olympia, Wash.—Seven thousand eight hundred feet of Pacific highway from city limits of Seattle to Renton will be graveled and planked in near future.

Highway Board setting aside \$2,000 for that purpose. Board also approved plans for Sunset highway from Cle Elum to North Bend, bringing the total of plans for this stretch up to \$311,727 out of appropriation of \$335,999, which leaves an apparent surplus of \$23,272. Twelve thousand dollars will be appropriated over nine counties through which Pacific highway passes, according to Board's action. Plans are approved for expenditure of \$30,000 from Walla Walla to Touchet on Inland Empire highway.

Seattle, Wash.—Repaving of 2d Ave. from Pike St. to Gesler Way has been ordered.

Seattle, Wash.—City Council will order improvement of Sierra Drive, from Cascadia Ave. to Terminal Court; Landing Parkway, from Sierr Drive to Lake-wood Ave., by paving same with asphalt or some other suitable material laid upon proper concrete foundation with armored concrete curbs and brick gutters, by construction or reconstruction of concrete walks, and by construction or reconstruction of all sewers, side sewers and water mains with their appurtenances that may be necessary for proper sewerage, water service and fire protection of said district. H. W. Carroll is City Comptroller.

Spokane, Wash.—City Engineer has completed plans for paving of Boone Ave. at cost of about \$8,000.

New Westminster, B. C.—Columbia St., near penitentiary, will be paved at cost of about \$65,000.

Vancouver, B. C.—City Council has ordered paving of South Cambria, Drake, Cordova and Vine St., also Victoria Drive, Commercial Drive and 71st Ave. Estimated cost, \$311,776. F. L. Fellows is engineer.

CONTRACTS AWARDED.

Phoenix, Ariz.—For improvement of Cactus Way and the East and West Alley in Block 22 to Barber Asphalt Paving Co. at following bid: 227.59 sq. yds. bitulithic pavement, \$2.15 per sq. yd.; 150 lin. ft. concrete gutter, \$1 per lin. ft.; 59 lin. ft. concrete gutter, 1/2 width only, 50 cts. per lin. ft.; 1 structure on east side of Lot 13, block 22 Phnx., incl. 2-in. bitulithic wearing surface, \$718.68; 1 structure on south side Lot 13, block 22, Phnx., incl. 2-in. bitulithic wearing surface, \$305.80; 1 structure on south side of lot 15, block 22, Phnx., incl. 2-in. bitulithic wearing surface, \$139.05; 1 structure on east side of lot 14, block 22, Phnx., incl. 2-in. bitulithic wearing surface, \$809.93.

Tucson, Ariz.—For construction of 19,923 sq. yds. bitulithic pavement to Arizona Asphalt Paving Co. at \$2.19 1/2 per sq. yd., or total of \$62,440.64. Also for 22,605 sq. ft. cement sidewalk at 15 cts. per sq. ft.

Oakland, Cal.—Contract for improving Nicol Ave., from Peralta to Dellview Ave., has been awarded to H. Sundberg.

San Mateo, Cal.—A contract for paving of lower half of San Mateo Park has been awarded to Clark & Henery, contractors, by Bd. of Trustees, at \$107,000.

Hartford, Conn.—To A. B. Caldwell, New Britain, at about \$16,535, for 9,077 lin. ft. of native stone macadam road in town of Canton.

Hartford, Conn.—To A. Vito Constr. Co. at \$20,000, for 7,650 lin. ft. of native stone macadam in town of Washington.

Tampa, Fla.—To Edwards Constr. Co., at \$1.89 per sq. yd. for paving of Nebraska St., from Whiting to Water Sts., by Pub. Wks. Bd.

Tampa, Fla.—To Georgia Engrg. Co., at \$2.13 per sq. yd., for paving of portion of 22d St., 1st to 9th Aves., at \$1.97 and \$1.82, for two sections of 9th Ave. and at \$1.66 for 8th Ave., 22d to 24th Sts., by Pub. Wks. Bd.

Elgin, Ill.—To Logan & Giertz Constr. Co., of Elgin, for paving Fulton St., 2,424 sq. yds., at \$4.795, and West Chicago St., 2,294 sq. yds., at \$5.010, with brick on concrete base; also same contractors for paving First District, including DuPage, Fulton, Prairie, Milwaukee Sts., Park Row, Gifford Place, Raymond, Channing, Gifford, Chapel and Geneva Sts., about 42,852 sq. yds., at \$62.100, for macadam base bituminous macadam pavement with granite wearing surface. Wm. F. Svila, City Clk., Detail bid of Logan & Giertz Constr. Co., of Elgin, for paving above Dist. 1, is as follows: 42,852 sq. yds. asphaltic macadam pavement, \$1.25; 16,670 lin. ft. combined curb and gutter, 45 cts.; 96 lin. ft. curb, 20 cts.; 330 lin. ft. gutter, 20 cts.; 14 catch basins, each \$20; 160 lin. ft. oak headers, 25 cts.; 114 crosswalk headers, each \$2; 114 gutter plates, \$3; adjusting catch basin and manhole, each \$50; total, \$62,100. Totals of other bids: Western Improv. Co., Racine, Wis., \$64,-

\$33; Foley Constr. Co., Chicago, Ill., \$68,690, and H. G. Goelitz, Oak Park, Ill., \$68,907.

Lebanon, Ind.—By Bd. of Comrs. of Boone Co., to Pat. Shahan, \$1,100, for construction of road in Sugar Creek.

Bedford, Ind.—By Comrs. of Lawrence Co., to Jacob T. Weaver, Sparksville, Ind., at \$2,985, for construction of gravel road.

Princeton, Ind.—By Gibson Co. Bd. of Comrs., to C. W. Sterman, for construction of 3-mile crushed stone road. Harry Morrison is Co. Surv.

Williamsport, Ind.—By Bd. of Comrs. of Warren Co., contract to Geo. H. Gallows, \$10,400, for improvement of highway in Pike Twp.

Des Moines, Ia.—The Des Moines Asphalt Co. has been given contract for patching pavement of West Grand Ave. by City Council.

Pittsfield, Mass.—Bd. of Pub. Wks. has voted to award contract for putting in cement floors and sidewalks at Lyman St. bridge to Charles F. Reid, for \$959.02.

St. Joseph, Mich.—To Jacob Ackerman & Co., La Porte, Ind., at \$17,200, for construction of three miles of Three Oaks-Gallen Rd., and at \$28,675, for 5.6 miles of New Buffalo-Three Oaks Rd.

Granite Falls, Minn.—For constructing State Rural Highway No. 1 to J. Sampson of Sioux Falls, S. D., at \$67,070. Contract calls for approximately 70,806 Cu. yds. grading, 68,779 lin. ft. turnpiking, 25,496 cu. yds. graveling, and erecting 5 bridges as follows: a 40-ft. reinforced concrete, a 25-ft. I-beam span, a 40-ft. plate girder and 30-ft. I-beam span bridges, 6 concrete culverts and 122 corrugated iron culverts.

Joplin, Mo.—To E. O. Moats, of Joplin, contract for 2 blocks of creosoted wood block paving in 4th St. C. B. Anderson is City Engr.

Newark, N. J.—For repaving Broad St., from Belleville Ave. to South St., with wood block pavement, to Newkirk Paving Co., at \$273,473.

Syracuse, N. Y.—To Guy B. Dickinson, city, at \$49,041, for paving of S. Wilbur Ave., from Gifford St. to Tompkins St., with vitrified brick, by Bd. of Contract & Supply.

Connellsville, Pa.—For paving Race St., between Green St. and Davidson Ave., to Duggan & Miller, at \$13,250.

Harriman, Tenn.—To Frank Ladd, Jr., contract for finishing pike between Harriman and Oliver Springs.

Fort Worth, Tex.—To Tarrant Constr. Co., at \$1.45 per sq. yd. for paving 3,258 sq. yds. of West 7th St. bridge with brick, by Co. Comrs.

Houston, Tex.—To Eureka Constr. Co., for paving Montgomery Ave., between north line of Hogan and north line of Boundary Sts., at \$27,835 for sheet asphalt, and \$27,835, for asphaltic concrete; also at \$13,559, for paving Montgomery Ave., between north line of Wood and north line of Hogan Sts., with brick furnished by city, and at \$8,279, for paving of Houston Ave., from M. K. & T. R. R. tracks to White Oak Bayou. Brick furnished by City. E. E. Sands is City Engr.

San Antonio, Tex.—Paving Expert C. D. Pollock has recommended and City Council has accepted bid of Rushmore & Goudy, of Kansas City, Mo., to pave East Commerce St., 32,000 sq. yds., with vertical fiber vitr. brick on 5-in. concrete base, at \$2.51 per sq. yd. This is the first contract to be let of the \$4,000,000 paving fund available by city at this time. Fred Freies is City Clk.

Spokane, Wash.—Contract for paving of alley between 2d and 3d Aves., Washington to Stevens Sts., has been awarded to Mitchell Bros. at \$942. Bituminous No. 1 is material to be used. There were nine bidders for sewer contract.

Winnipeg, Can.—To Bitulithic Paving Co., Winnipeg, at \$246,258, for seven additional miles of paving on Portage Ave., extending to Headingly.

SEWERAGE

Gadsden, Ala.—City Engineer has been urged to complete survey for proposed West Gadsden sewerage so as to have improvement made before next summer.

Napa, Cal.—Bonds in sum of \$10,000 have been voted for storm sewer system for North Napa.

Red Bluff, Cal.—City has voted bonds in sum of \$8,000 for extension of sewer system.

San Francisco, Cal.—Board has ordered construction of sewers in Locksley and 7th Aves., between Noriega and Lawton Sts. Cost is estimated at \$22,000, and interested property owners are to buy sewer bonds of 1914 issue to provide sum needed.

Bridgeport, Conn.—City Engineer A. H. Terry has stated that it would cost approximately \$1,000,000 to put sewer system of city in shape it ought to be. He also stated that it would probably cost \$150,000 to build two interceptor sewers, one on each side of river, to take care of sewage now emptied into Pequonnock River between Congress St. and Berkshire bridges, as required by order of Superior Court.

Wilmington, Del.—A special meeting of Water Bd. is being held to consider construction of new sewer from Du Pont Powder plant, at Henry Clay, to connect with city sewer, or sewage disposal plant if sewer is not built. Water Board objects to disposal plant draining into Brandywine.

Mt. Vernon, Ill.—City is contemplating construction of about 3 miles of sanitary lateral sewers early in spring. B. C. Wells is City Engr.

Clarion, Ia.—Definite plans are being made for sewerage system. It is thought that two large drain pipes will be laid, one on each side of city, to meet in south part of town, septic tank system to be installed. Cost will be about \$40,000 and sewer district for entire city will be made. Engineer Currie, of Webster City, has plans nearly perfected.

Haltstead, Kan.—City Council has ordered several blocks of sewer extensions, which will be included in work now under construction. Albert C. Moore, Engr., Bartlett Bldg., Joplin, Mo.

Baltimore, Md.—All bids have been rejected for Sewerage Comm. contract for lateral sewers in South Baltimore. Bid of \$70,000 submitted by Whiting-Turner Constr. Co., lowest bidder, was considered excessive.

Milwaukee, N. J.—Sewer and water systems are to be built in accordance with specifications at cost, including land and easements, not to exceed as follows: sewers, \$57,500; water system, \$45,000.

Orange, N. J.—Ordinance has been passed to provide for construction of storm and surface water drain in Halsted Valley in 3d Ward, between Morris and Essex R. R. and South Orange Ave. L. E. Rowley is City Clk.

Pitman, N. J.—Municipal sewerage system has been planned.

Larchmont, N. Y.—Village of Larchmont has until Feb., 1914, in which to file plans for a sewage disposal works. Herring & Gregory, Sanitary Engrs., are preparing plans for disposal plant similar to one proposed for village of Mamaroneck.

Syracuse, N. Y.—City Engineer H. C. Allen in his annual report recommends construction of trunk sewer from Onondaga Creek through south sections of 19th and 17th Wards, and storm water sewers in First and Second Wards.

Walden, N. Y.—At meeting of Board of Trustees, Village Engineer Charles H. Smith of Middletown was requested to have plans and estimations of proposed trunk sewer to be placed in Tenbrook ready for the Board.

Waterloo, N. Y.—At special meeting of Village Trustees Engineer Bowman will submit plans for erection of two Ernhoff septic plants, instead of one large disposal plant, called for in original sewer plans. Tanks are to be erected on either side of Seneca River and will do away with necessity of pumping station. In addition to plans Engineer Bowman will submit all data in reference to cost of construction, maintenance and operation of plants. If plans are ratified by Board it is probable that bids will be advertised for immediately, as entire sewer system is now nearing completion.

Akron, O.—Bonds in sum of \$10,000 for Fifth Ave. sewer will be sold by James McCausland, City Auditor, until 12 noon, January 19.

Akron, O.—Ordinance has been passed to issue bonds in sum of \$10,000 for improving and repairing main trunk sewer in Little Cuyahoga River Valley.

Akron, O.—Ordinance has been passed determining to proceed with improvement of Johnston St. from Arlington St. to River St. by constructing sewer therein together with laterals thereto for house connections, and by constructing water service connections.

Springfield, O.—Question of sewerage and garbage disposal is being discussed. Erection of incinerator is favored.

Atoka, Okla.—Bonds in sum of \$30,000 have been voted for construction of sewer system. C. M. Neal is Mayor.

Williamsport, Pa.—Resolution has been passed transferring \$2,200 and \$4,200 from ordinance providing for construction of Louisa St. sewer to ordinance for construction of Park Ave. storm sewer.

Cleveland, Tenn.—It is proposed that Cleveland shall have sewerage system, and to this end City Council has passed

sewer bond ordinance carrying appropriation of \$75,000 for purpose. Board contracted with the Solomon & Norcross Engrg. Co., of Atlanta, Ga., some time ago, to build system, and it is expected that work will begin just as soon as bonds are sold. Cleveland will have septic tank system of sewerage, which will accommodate entire town at outset.

Waco, Tex.—Date of next election will shortly be fixed. Taxpayers will vote on bond issue for building sewers and bridges.

Seattle, Wash.—City Engineer A. H. Dimmock has prepared plans and bids will soon be received by Board of Public Works for construction of sewers in Swift Ave. Estimated cost, \$17,500.

CONTRACTS AWARDED.

Oakland, Cal.—To Philip Schuyler for constructing storm sewer in 26th St.

Takoma Park, D. C.—To Caylor & Snyder, Washington, contract for constructing sewer and drain connections for ward "A," Takoma Park.

South Bend, Ind.—Contract for pipe sewer on Blaine Ave. from Van Buren to Quincy St. has been awarded to Henry Devoss for \$1,003.40.

Council Grove, Kan.—To Everett & Burt, of Hutchinson for installation of sewer system, including Imhoff tank system of disposal.

Baltimore, Md.—To Ryan & Reilly, contract for building series of storm water drains at their bid of \$92,103.30. William Myers & Co. was awarded contract for grading west side of Calvert St.

Boston, Mass.—By Comr. Pub. Wks., for sewerage works for Davenport Brook in private land between Burt and Washington St., Dorchester, to Anthony Barualdi, \$7,049. Other bids as follows: M. De Sisto & Co., \$7,149; Joseph Rugo, \$7,502; McCarthy & Walsh, \$7,846; West Roxbury Trap Rock Co., \$8,547; Peter W. Hill, \$8,883; John McCourt & Co., \$9,213. Engineer's estimate, \$7,241.

Flint, Mich.—By city, to Arthur H. Prange, for construction of sewers on various streets.

Duluth, Minn.—To W. R. Peer, at \$1,996, for construction of sanitary sewer in E. 8th St., between 19th and 18th Aves.

St. Paul, Minn.—To John Lind, 377 Rondo St., city, at \$28,800, for extension of main trunk sewers on 3d Ave. and 3d St.

St. Paul, Minn.—Christ Johnson and M. A. Carlson have been awarded contracts by Board of Public Works for construction of several small sewers. Bids on various jobs by successful bidders follow: Christ Johnson—Tallula Pl., \$307.20; Jessamine St., \$826.94; Roy St., \$1,169.80; Herschel Ave., \$498.80; Blair St., \$1,034. C. A. Carlson—Sylvan St., \$324; Montrose Ave., \$1,350; Orange St., \$879.

Stillwater, Minn.—By City Council, contract to McGee & Nolan, at \$8,658, for constructing sewers in S. First St.

Kansas City, Mo.—By Secv. Bd. Pub. Wks., to W. C. Mullins, of Kansas City, for construction of Joint District Sewer Nos. 398 and 399, to serve Bull Run, as follows: 20 ft. 8-in. plain concrete pipe, 15 cts.; 10 ft. 10-in., 16 cts.; 650 ft. 12-in., 31 cts.; 1,600 ft. 15-in., 45 cts.; 2,060 ft. 21-in., 90 cts.; 430 ft. 24-in., 95 cts.; 40 ft. 27-in. reinforced concrete pipe, \$1.50; 4 ft. 30-in., \$2; 1,450 ft. 6-in., \$8.65; 30 ft. 66-in. reinforced monolithic concrete sewer, on curve, \$9.90; 820 ft. 72-in. reinforced monolithic concrete sewer, \$10.79; 480 ft. 78-in. brick sewer, \$9.22; 13 cu. yds. of rubble masonry, \$8; 36 manholes, Style "C-1," \$30; 1 drop manhole, Style "C-1," \$75; 1 special manhole, \$150; 6,200 cu. yds. earth excav., \$1.59½; 700 cu. yds. loose rock excav., \$2; 6,485 cu. yds. solid rock excav., 90 cts.; 70 cu. yds. Class "C" concrete, \$7; 1 reinforced concrete interceptor, \$332; 1 special entrance structure, \$617.

Springfield, Mo.—For construction of about two miles of 8 to 10-in. sewers, to E. W. Johnson, Springfield, at \$11,000.

Springfield, Mo.—Following bids have been received for construction of new district sewer in 1st Ward: J. J. Underwood, \$12,580; Plummer-Adams Co., \$12,109; and Fred Johnson, \$11,820.

Malta, Mont.—To Geo. W. Kemper, of Minot, N. Dak., for 1,250 ft. of 10-in. sanitary sewer. Gerharz-Jaqueth Engrs. Co., Great Falls, Mont., Engrs.

Newark, N. J.—Tabulation of figures in seven bids for contract to construct outfall pressure of the Passaic Valley Trunk Sewer, proved that lowest bid was that of Kingsbridge Contracting Co., of New York. The Kingsbridge concern's total estimate was \$1,327,480 which is said to be more than \$30,000 less than next lowest bidder. Award will not be decided upon until next week, but it is more than

likely Kingsbridge company will get contract.

Ridgewood, N. J.—By village for construction of sewer to Frank Puglia, at total bid of \$10,019. Itemized bid as follows: 1,040 lin. ft. of 8-in. V. T. at 80 cts. per lin. ft.; 1,473 lin. ft. 8-in. V. T. at \$1.40; 2,080 lin. ft. at \$1; 980 lin. ft. at \$1.10; 1,063 lin. ft. at \$1.10, and 870 lin. ft. at 90 cts. Other bids as follows: Jos. Cestone, \$12,801; P. Cestone, \$12,865; Fusco Const. Co., \$13,239; J. V. Meola, \$13,401; H. K. Corbin, \$13,856; Partridge & Burke, \$13,877; J. R. Donnelly, \$14,044; Cordell & Romano, \$14,876, and A. W. Gill, \$21,257. F. W. Simonds is Village Engr.

Woodbury, N. J.—For construction of about 7,000 ft. of 12 to 24-in. storm-water sewers in South Westville, to Redrow & Kendle, Pitman, N. J., at \$8,327.

Manassas, Va.—To Dabbs & Myers, Charlotte, N. C., at \$24,089, for furnishing of labor and material for installation of a sewerage system. N. Wilson Davis, Harrisburg, Va., Engr.

Spokane, Wash.—In executive session City Council awarded contract for installation of sewer in 25th Ave., Lamonte St. to Grand Blvd., to Dixon and Oliver, for \$1,465.

Racine, Wis.—To Birdsall-Griffith Constr. Co., contract for constructing sewers in South Lawn Addition, south of Case plant. P. H. Connolly is City Engr.

Toronto, Can.—By Bd. of Control, following contracts for Midway district sewerage system: Ashdale Ave. section, J. A. Jarrow, \$62,500; Lamb Ave. district, to the Comr. of Wks., \$90,000.

WATER SUPPLY

Eureka Springs, Ark.—Albert C. Moore, Consulting Engr., Joplin, Mo., has recently reported on cost of securing water from Blue Springs for public supply as follows: \$179,000 for pumping equipment and flow lines; \$10,000 for reinforced reservoir, and \$30,000 for extension to distribution system. T. J. Gordon is Mayor. Joe McKenney is City Clk.

Eureka Springs, Ark.—City Council has instructed Albert C. Moore, Engr., of Joplin, Mo., to proceed at once on design of water extensions to include concrete dam 40 ft. high and 300 ft. long for impounding reservoir, a four-unit filtration plant, filtered water reservoir, new piping equipment, and extensions to distribution system. T. J. Gordon, Mayor. Joe McKenney, City Clk.

Walnut Ridge, Ark.—City Council has engaged Frank L. Wilcox, of St. Louis, Mo., to prepare plans for water works and sewer system.

Venice, Cal.—City Trustees will employ engineer to prepare plans for water works system.

Hartford, Conn.—Plans are nearly completed by Chief Engineer Caleb M. Saville for Nepaug dams and dike.

Key West, Fla.—City Water Works is contemplating installation of one duplex, compound piston pump, 1,000 gallons per minute, for high pressure, 175 lbs., using 75 to 90 lbs. of steam. H. C. Wetmore, Supt. City Water Works.

Grand Ridge, Ill.—Village Council is discussing question of issuing \$7,500 bonds for construction of water works.

Silvis, Ill.—Village Board is making plans for construction of 500,000-gal. reservoir.

Moulton, Ia.—City Council is considering installation of water and sewer system.

Arkansas City, Kan.—City is considering expenditure of \$50,000 for additional water works improvements.

Douglass, Kan.—City will call for bids about middle of January for construction of waterworks and filtration plant. Dr. N. E. Wilson is Mayor. C. A. Ogg is City Clk. Albert C. Moore, Engr., Bartlett Bldg., Joplin, Mo.

Hancock, Md.—Expenditure of \$20,000 for installation of new equipment at water plant is being discussed.

Hancock, Md.—Contract will shortly be let for water works equipment at cost of \$20,000.

Peabody, Mass.—A filtering system for town water to cost \$75,000, will be brought before voters for their decision in near future. It is claimed for this proposition that filter bed will solve question of impure water. Engrs. Cuddyback and Johnson are engaged to draw the plans and will make report as to best methods to be employed.

Grand Rapids, Mich.—Specifications for purchase of new vertical triple-expansion pumps have been adopted by Board of Works and bids for same ordered. Pump must be in many particulars same as the Allis-Chalmers pump now in operation, except that special suction

will be eliminated. Capacity must be around 12,000,000 gallons every 24 hours.

Vicksburg, Miss.—Engineer A. T. Dabney of Memphis has been asked to give city necessary information for construction of water works system.

St. Louis, Mo.—Charles E. Swigley, Fire Department Chief, St. Louis, has recommended construction of high-service pumping station in central downtown district to cost about \$1,280,000.

Gering, Neb.—Plans are under preparation for water works system. Bond issue of \$19,500 was recently voted.

Morrill, Neb.—Citizens have voted to issue \$15,000 bonds for construction of water works.

Niobrara, Neb.—Bids will shortly be received by George L. Adams, City Clerk, for improvement of water system. Estimated cost, \$14,000. Grant & Fulton, Lincoln, are consulting engineers.

Milltown, N. J.—Water and sewer systems are to be built in accordance with specifications at cost, including land and easements, not to exceed as follows: water system, \$45,000; sewers, \$57,500.

Mamaroneck, N. Y.—Mamaroneck Vill. Bd. of Trustees have authorized purchase of gauge with which to test pressure at fire hydrants.

Ovid, N. Y.—Citizens are considering installation of waterworks system.

Syracuse, N. Y.—City Engineer H. C. Allen in his annual report recommends construction of second water storage reservoir on south portion of Thornden property.

Raleigh, N. C.—City Commission has signed contract or agreement with directors of Central Hospital by which city gets for 30 years right to build dam, impound water for city use and remove trees from site of storage basin, upon condition that it furnish water free to the hospital to amount of 50,000,000 gallons a year; hospital to pay 6 cts. per 1,000 gallons if it uses more.

Huntingdon, Pa.—Bids will be received in a few months for construction of filtration plant to cost about \$40,000. J. M. Africa, Huntingdon, is engineer.

Providence, R. I.—Board of Contract and Supply has received recommendations of City Engineer regarding awarding of contract for new 30,000,000-gallon pump for Pettaconsett pumping station, and laid matter of award on table until December 29.

Latta, S. C.—Election may shortly be held to vote on issuing \$50,000 bonds for water works.

Beaumont, Tex.—Engrs. Burns & McDonnell, of Kansas City, in a report, recommend that \$47,000 be expended in improving filter plant, \$60,000 for additional mains, and \$74,000 for moving intake.

Dallas, Tex.—That same changes in specifications for restoration of works on north wall of coagulating basin of filtration plant will be necessary as result of slide on Dec. 1, was reported to Board of Municipal Commissioners by J. H. Fuentes of New York, expert hydraulic engineer. Surveys have been made as to extent of mishap and inquiry into causes of slide. Cost of restoration was estimated at about \$5,000.

Fort La Vaca, Tex.—Application has been made for franchise to install and operate waterworks system.

Fort Stockton, Tex.—Council has been asked to call election to vote on bond issue of \$50,000 for water works system.

Graham, Va.—City is considering expenditure of \$15,000 for improvement and extension of water system.

CONTRACTS AWARDED.

Hartford, Conn.—For furnishing 658 tons of c-i. pipe by Water Board to Fred. A. Houdette & Son, Inc., Boston, at \$14,652. Other bidders: John Fox & Co., New York, \$14,754; Standard Cast Iron Pipe & Foundry Co., Bristol, Pa., \$14,951; U. S. Cast Iron Pipe & Foundry Co., Burlington, N. J., \$15,040; Warren Foundry & Machine Co., New York, \$15,545; Florence Iron Works, Florence, N. J., \$16,547.

Lafayette, Ind.—By Board of Works, to Laidlaw-Dunn-Gordon Co. of Chicago, contract for new 3,000,000-gallon pump to be installed in Columbian park pumping station. Contract price is \$5,800.

Mount Ayr, Ia.—To Des Moines Bridge & Iron Wks., Des Moines, at \$36,169, for installation of waterworks system.

Mt. Ayr, Ia.—For constructing water works, to the Des Moines Bridge & Iron Works, of Des Moines, at following bid: 7,600 ft. 8-in. c-i. pipe laid, 86 cts.; 2,100 ft. 6-in. 60 cts.; 23,000 ft. 4-in., 47 cts.; 11,000 ft. 2-in., 19 cts.; 20,000 lbs. c-i. specials, 3 cts.; 46 4-in. hydrants set, \$30.26; 1 4-in. water crane hydrant, \$65.65; 5 8-in. valves with boxes, \$25.90; 4 6-in., \$18.55; 22 4-in., \$13.80; 11 2-in., \$10; 50,000 gal. 100-ft. water tower with

foundation, \$3,985; 2 30 h. p. oil engines, \$1,840; 2 8½x10 triplex pumps, \$1,613; one pump house building, \$1,050; one 10,000-gal. oil tank, \$400; one dam and collecting gallery, \$3,950; total, \$36,235. Totals of other bids: Black Hawk Construction Co., Waterloo, \$39,934; Bash & Gray, Joplin, Mo., \$36,988; Inter-Mountain Construction Co., Tecumseh, Neb., \$40,122; Moffit Construction Co., Des Moines, \$39,757; Arthur A. Dobson Co., Lincoln, Neb., \$37,735; W. D. Lovell Co., Minneapolis, Minn., \$37,300; Public Service Co., Omaha, Neb., \$37,501.

Arma, Kan.—For drilling well for proposed water works, to C. H. Bailey of Pittsburg, Kan., at \$1.80 per lin. ft.

Olathe, Kan.—For improvements to municipal water works, as follows: To Des Moines Bridge & Iron Co., of Des Moines, Ia., general contract, at \$49,799; a portion of the latter was sub-let to J. H. Cosgrove & Son, of Olathe, for building a 25-ft. dam at Cedar Creek, west of Olathe, which will increase water capacity to 145,000,000 gals. Filter equipment contract awarded to the Pittsburgh Filter Co., of Pittsburgh, Kan., at \$4,390. E. E. Harper is Engr., Grand Ave. Temple, Kansas City, Mo.

Beatrice, Neb.—To Intermountain Bridge & Constr. Co., Tecumseh, Neb., at \$30,000, for water works improvements. H. M. Garrett is City Clk.

Minatare, Neb.—To J. C. Schwartz, Hayden, Colo., contract at \$13,472 for constructing water works. C. A. Smith is Engr., Denver, Colo.

Minatare, Neb.—By U. S. Reclamation Service contract with Pittsburgh Valve Foundry & Construction Co., of Pittsburgh, Pa., for furnishing needle regulating valves for Cinitare dam, North Platte irrigation project, Neb., at \$4,528.

Columbus, O.—To H. E. Miller, Linden, at \$7,488, for construction of 8-in. water main from corner of Miller Ave. and Schiller St., to water tower, by Co. Comrs.

Lima, O.—To Rock Island Bridge & Iron Works, of Rock Island, Ill., for 100,000-gal. steel tank on 136-ft. steel tower for State Hospital, Lima.

Manassas, Va.—To Applegate & Son, Bradford, Pa., at \$31,488, for furnishing of labor and material for installation of waterworks system. N. Wilson Davis, Harrisonburg, Va., is Engr.

Centralia, Wash.—At special meeting of City Commission, contract for construction of Centralia's municipal gravity water system was awarded to W. H. Mitchell of Seattle, who was lowest of 12 bidders. Mr. Mitchell's bid amounted to \$124,758.70 if work was paid for in cash, and \$135,907.50 if payment was received in bonds. Successful bid was considerably lower than estimate of City Engineer Stanley Macomber. Other bidders were Sausetz & Thorsing of Bellingham; Alfred & James of Centralia; George P. Wright of Tacoma; Atlas Construction Co. of Everett; E. O. Hall of Hood River, Ore.; Washington Construction Co. of Seattle; P. E. McHugh of Tacoma; Elliott Construction Co. of Portland; N. A. Jones Construction Co. of Tacoma, and Kennedy Construction Co. of Spokane.

Niagara Falls, Ont., Can.—On recommendation of Engr. Carl Gardner, Stamford Council has accepted bids of Darlington Pump & Mfg. Co., and Canadian-Fairbanks-Morse Co. on supplies for proposed new water works system. It was decided to purchase necessary fire hydrants from Darlington Co. Other company is to supply valves.

Pearl Harbor, T. H.—For furnishing a 250,000-gallon tank and tower for U. S. Naval Station, Pearl Harbor, to Des Moines Bridge & Iron Co., Pittsburgh, Pa., at \$13,850.

LIGHTING AND POWER

Brewton, Ala.—Within a few weeks city expects to purchase one 150-kw. generator, one 4-valve engine, directly connected to generator, one 175-hp. boiler and one electrically operated pump; also one series street lighting system complete. D. B. Hayes is City Clk.

Gadsden, Ala.—Preliminary movement of city administration looking to working out plan for maintaining and operating electric power plant in connection with water works department is meeting with almost universal approval.

Gadsden, Ala.—Formal steps toward securing municipal electric light plant for Gadsden have been taken and special committee of Aldermen, composed of Light Committee and Aldermen Johnson, Jackson and Allison and Mayor Holcombe, has been appointed to investigate the subject.

Gadsden, Ala.—Committee has been appointed to investigate feasibility of plan for installing electric plant at water works plant.

Fort Smith, Ark.—Question of municipal electric light plant is under consideration.

San Francisco, Cal.—The North-of-Panhandle Improvement Association has decided to request Board of Supervisors to extend street lights now in use on Fell St., to Baker St., to Fulton, thence on Fulton to Divisadero St.

San Francisco, Cal.—Installation of electric light on Golden Gate Ave., between Market and Millmore Sts.; Ninth St., south of Market, and Polk St., from McAllister to Sutter is being discussed.

Bridgeport, Conn.—Mass meeting will be held for discussing "great white way." It is proposed to have additional lighting system extend on Fairfield Ave., from railroad station to Courtland St.; Main St., from Gilbert St. to Bull's Head; State St., from Main to Courtland St., and on Broad St., from Elm to State St.

Bridgeport, Conn.—Mayor Clifford B. Wilson has presided at first meeting of Committee on "Great White Way." Nothing of importance was done except to outline plans for work on part of all members. Committee are of opinion section of city to be thus lighted should embrace Main St., from Bull's Head to Gilbert St.; State St., from Main to Courtland St.; Fairfield Ave., from Courtland to Water St.

Hartford, Conn.—Matter of awarding contract for ornamental street lighting has been postponed until Dec. 30.

Loveland, Colo.—City Council will engage engineer to prepare plans for municipal electric light plant.

Gillespie, Ill.—City Council has authorized light committee to prepare plans for improving street lighting system in business section.

Cambridge City, Ind.—Citizens wish to secure cluster lights for Main St. as soon as possible.

Sibley, Ia.—Installation of electric light and power plant is under consideration.

Lebanon, Kan.—Bonds amounting to \$18,000 have been voted by people of Lebanon for municipal lighting plant. It will be modern in every detail and city officers have awarded contracts for machinery and installation.

Sabetha, Kan.—Managers of municipal electric light plant are considering rebuilding of distribution system, material for which has already been purchased; installation of ornamental street lighting system is also under consideration. F. W. Hunter is Gen. Supt.

Irvine, Ky.—Town of Irvine will advertise electric light franchise and sell in next 30 days. Write for particulars, Chairman Town Council, Irvine, Ky.

Logansport, La.—Erection of electric light and ice plant here is being promoted by P. W. McKittrick, of Timpson, Texas.

Burnt Hills, N. Y.—Question of installing electric street lighting is being discussed.

Deerfield, N. Y.—A petition has been presented to Town Board to establish lighting district to include Deerfield village, and to enter into contract to light same for period not to exceed 10 years.

Marcellus, N. Y.—The managers of Marcellus lighting plant will shortly purchase some lightning arresters and transformers. F. W. Knapp is mgr.

Syracuse, N. Y.—Revised map of proposed ornamental lighting district has been completed by City Engr. Henry C. Allen, and it is expected ordinance approving it will be reported to Common Council by Com. on Lighting, Poles and Subways.

Warsaw, N. Y.—Bd. of Trade is considered adopting of proposition of boulevard lighting for Main St. Plan involves electric lights on small lamp posts about 200 ft. apart, alternating either side of street.

Kinston, N. C.—Kuemmerle & Co. of Philadelphia will be permitted to operate gas plant in Kinston if proposition they make is satisfactory to public.

Cleveland, O.—About 15 miles of overhead wires will be placed underground by public utility corporations next year. W. J. Springborn is Dir. of Pub. Serv.

Cleveland, O.—City Council will expend \$18,504 for purchase and installation of 18 transformers (500 kva) and \$37,000 for cable for municipal electric light plant. W. J. Springborn is dir. of Pub. Serv.

Johnston, R. I.—Plans are being discussed for street lighting system. Highway maps and other data are being prepared.

Olneyville, R. I.—Revising of street lighting system is being planned.

Milwaukee, Wis.—Provisions for \$100,000 bond issue for municipal lighting plant have been voted into 1914 budget by Bd. of Estimates.

Nelson, B. C.—City Council is considering installation of tungsten street lighting system, to cost about \$16,000.



The Metropolitan Paving Brick Co.

"Best Paving Block Made"



Quality is Economy

**Highest Quality
Moderate Prices
Prompt Shipments**

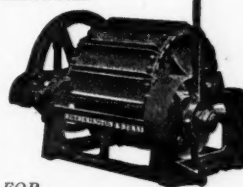
are what you get when you buy

"Clearfield" or "Standard" Pavers

Clearfield Brick Mfg. Co.
Clearfield, Pa.

Be absolutely certain that
your Paving Brick conform
to Standard Specifications.

N. P. B. M.
STANDARD
RATTLER



FOR
THE TESTING OF
PAVING BRICK

**The H & B
Paving Brick
Testing Machine**

is constructed exactly to
the specifications of the
National Paving Brick
Manufacturers' Association. Will save its initial
cost to any municipality
or contractor within a
short time.

For descriptive circular and
prices address
Hetherington & Berner
Indianapolis, Indiana

OUR **WYCKOFF PIPE & CREOSOTING CO.**
50 Church St., NEW YORK
Send for Catalogue "D"

Creosoted Wood Blocks

WYCKOFF
CONDUIT for
underground wires, and
all forms of creosoted wood
Creosoting Works and Factory: Portsmouth, Va.

WILL NOT BUCKLE OR DECAY

Dunn Wire Cut Lug Brick

are superior to repressed brick in density,
bonding strength and durability,
yet cost no more. Ask for particulars.

Dunn Wire Cut Lug Brick Co., Conneaut, Ohio

**PATERSON
Clay Products Co.**
Clearfield, Pa.
Paving Blocks



PIONEER MANUFACTURERS OF

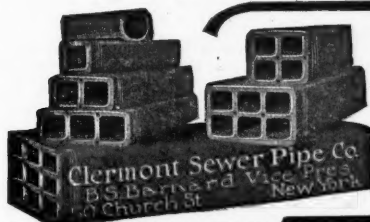
Hotchkiss Steel Forms

For walks, curbs, curb and gutter combined,
driveways, roads, pavements, etc.
The benefit of 20 years' experience as successful
contractors yours for the asking.

Hotchkiss Lock Metal Form Co.
Binghamton, N. Y.



**SAFETY INSULATED
WIRE & CABLE CO.**
114 LIBERTY ST., NEW YORK
CHICAGO BOSTON
SAN FRANCISCO



**UNDERGROUND CLAY CONDUIT
and Superior Clay Products**

"We defy the world in quality"

THE DUSTOLINE CO.

SUMMIT, N. J.
FOR ROADS

A product of which pure "Gilsomite" Asphalt is the base—manufactured under processes which make it the most durable, uniform and efficient material known for



Paving, Roofing, Waterproofing, Underground Pipe Dips and Coatings, Mastic Flooring, Paving Filler, Wire Insulation

Send for literature describing its use for any purposes named.
Standard Asphalt & Rubber Co., 137 LaSalle Street, Chicago

"BUCKEYE" Sandstone Curbing

A PERMANENT Pavement Should Have a PERMANENT Curbing

Northern Ohio Sandstone, commonly called Berea or Amherst Stone, has stood the test for forty years. "Buckeye" is the standard. Specify it. The price is surprisingly low. In the rough or machine dressed.

WRITE FOR PARTICULARS

THE OHIO QUARRIES COMPANY
CLEVELAND, OHIO

ASK THE MAN WHO HAS ONE

Our hundreds of satisfied customers are convincing proof of the reliability of the

COOL RUNNING RELIANCE CRUSHER

Universal Road Machinery Co., Kingston, N. Y.

BOSTON ROCHESTER NEW YORK

BUFFALO PITTS ROLLERS

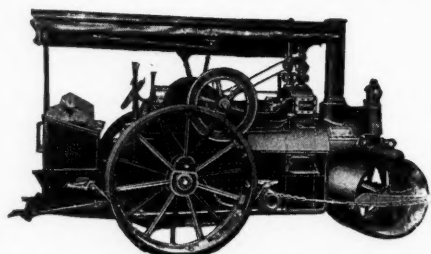
Macadam Rollers
Tandem Rollers
Asphalt Rollers

Embankment Rollers
Combination Rollers
Road Scarifiers

SEND FOR CATALOG

BUFFALO STEAM ROLLER CO.,
Buffalo, N. Y.

IROQUOIS ROLLERS



Tandem and
Macadam.

Based on
20 years'
experience.

All sizes.

THE BARBER ASPHALT PAVING CO.

Iroquois Works, 178 Walden Ave., Buffalo, N. Y.
Manufacturers of a complete line of paving and road machinery and tools.
Send for Catalogue.

Quality



Service

2000% Increase in 15 Years

Capacity 1898, 600,000 Barrels

Capacity 1912, 12,000,000 Barrels

The keynote of this unprecedented growth is the

QUALITY
of
Lehigh Portland Cement

Put Lehigh to any test and convince yourself of its supreme quality.

LEHIGH PORTLAND CEMENT CO.

Main Office
ALLENTOWN, PA.

Western Office
CHICAGO, ILL.

EVERY MUNICIPALITY SHOULD USE UGITE

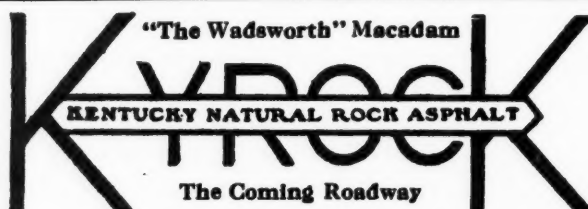
To Insure Good, Permanent Roads

UGITE has been successfully used on every type of road construction and is prepared in six grades, for hot or cold application, to meet varying conditions or methods of treatment.

Our Road Department is at your service for the solution of any problem of road construction and maintenance.
Write for explanatory booklets today.

THE UNITED GAS IMPROVEMENT COMPANY

Road Department,
100 North Broad Street, PHILADELPHIA

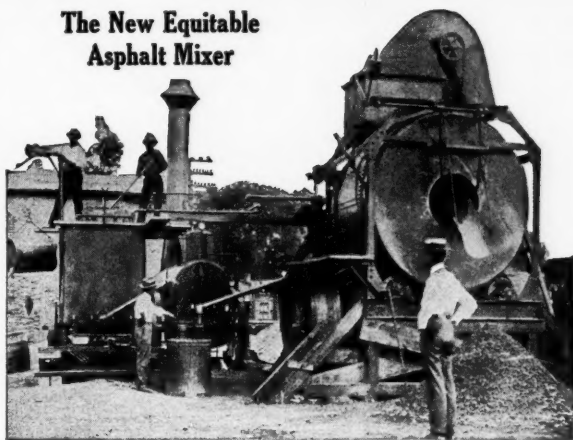


A roadway on which ground Kentucky Rock Asphalt (containing an average of not less than 7% Bitumen) is used for top dressing in place of screenings.
Using "Kyrock" (without heating) as a binder and wearing surface in place of screenings produces the Best Dustless Roadway known on the market.

Write for Illustrated Booklet

THE WADSWORTH STONE & PAVING CO.
PITTSBURGH, PA.

The New Equitable
Asphalt Mixer



Asphalt Patches at 52½c Per Square Yard

That is what it cost the City of Cleveland. Complete resurfacing of asphalt streets cost from 43c to 70c per square yard. These results were obtained with the

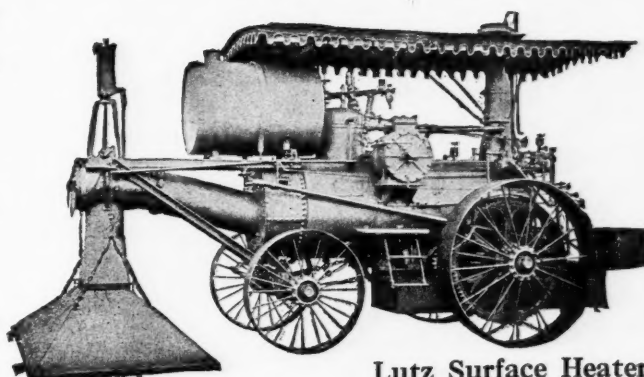
Equitable Asphalt Mixer and Lutz Surface Heater

The saving was 61c and 91c per square yard respectively over the cost of the two previous years.

If you have asphalt streets this equipment will enable you to maintain and renew them at the lowest possible cost.

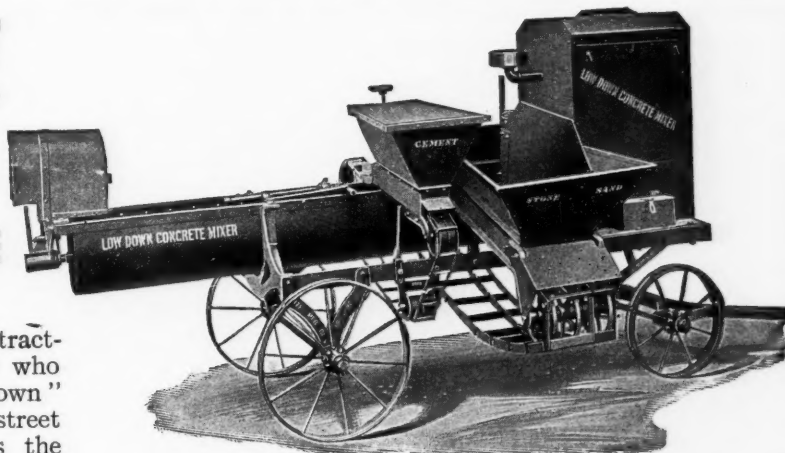
Equitable Asphalt Maintenance Co.

3 Commerce Bldg., Kansas City, Mo.



Lutz Surface Heater

FOR ROAD AND STREET WORK This "Low Down" Can't Be Beaten



We are hearing every day from contractors and concrete builders and workers who are using—or have used—our "Low Down" Force-Feed concrete mixer on road and street work. Without exception they tell us the "Low Down" has more than made good for them. It is proving that it is the practical and economically operated machine for this sort of work.

Our "Low Down" is giving great satisfaction everywhere it is in service—it is doing better concrete mixing work than it is possible to secure with the largest and most expensive mixers.

Our "Low Down" mixer is a positively accurate proportioning mixer of the continuous type. It is always reliable. It is a labor saver, for the low hoppers are easy to fill. It is a money saver, because it always mixes properly the cement, sand and stone.

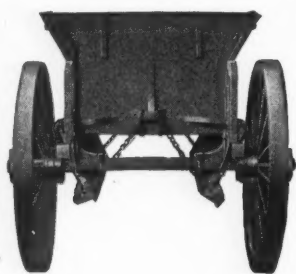
The "Low Down" Mixer operates easily and very simply. The chain elevator acts as a force feed, forcing the stone, sand and cement (wet or dry) into the mixing trough. You can see the feeding at all times. The capacity of this Mixer ranges from 4 to 12 cubic yards per hour, according to the adjustment made. Proportions can be changed while machine is in operation. Power equipment includes gasoline engine driving through gears. The "Low Down" Force Feed Concrete Mixer is designed and built according to proper mechanical principles. Only the best grade of Malleable Iron and Steel is used. The "Low Down" mixer is strong and durable in every way.

Particular features of the "Low Down" mixer include accurate measuring; low down hoppers; chain elevators; mixing paddles always in plain view; mixing and feeding always in plain sight; simple in construction and easy to operate; no frictional devices to wear out; does away with one-fourth the labor of mixing concrete.

We want to send you our new catalog. It explains "Low Down" operation in every particular—and why the "Low Down" is the particular mixer. Get a copy to-day.

ELITE MANUFACTURING COMPANY, Ashland, Ohio

Honestly Now—



Which dumping wagon would you rather buy—the one which the salesman promises will be “just as good” as the Watson—or the Watson, which has met every test for twenty-six years?

Think it over. It's a reasonable proposition.

WATSON WAGON COMPANY CANASTOTA, NEW YORK

The World's Largest Builders of Dumping Wagons.

BRANCH OFFICES:

256 Broadway, New York, N. Y.
1102 Farmers Bank Bldg., Pittsburgh, Pa.
604 Witherspoon Bldg., Philadelphia, Pa.
1377 Main St., Buffalo, N. Y.



Studebaker

No matter what dump wagon you have used in the past or with what degree of satisfaction, you cannot afford to pass up the Studebaker Steel Frame Wagon without investigating. It's the dump wagon with a chassis. Ask us about it.

We Build Sprinklers, Sweepers, Pneumatic and Power Flushers, Distributors for road building and dust laying materials, Garbage Wagons and Carts, Bottom Dump Wagons and Boxes, Street Cleaners' Carts, Vehicles, Harness, Automobiles. Catalogs and complete details upon request.

New York	STUDEBAKER	San Francisco
Kansas City		Philadelphia
Chicago		Denver, Dallas
Minneapolis		Salt Lake City
Portland, Ore.	South Bend, Ind.	Boston, Mass.

AD. NO. 1904

BAIN Dump Wagons Cost More to Make

Lumber Seasoned Three Years in the Open

Quality always costs, but quality always pays. Cities and the contractors who buy BAIN Dump Wagons do not consider the price, but our record for the past sixty years of honest, skillful workmanship. The quality of BAIN wagons has made us one of the largest wagon works in America.

Write for specifications and prices.

**The Only Economical
Wagon**



Doors Close Watertight. Hung on Loops. Easily Operated. One Lever. One Chain.

Sold in

BALTIMORE
DETROIT
PITTSBURGH
COLUMBUS
CINCINNATI
CHICAGO
BROOKLYN
LOUISVILLE
SACRAMENTO
SAN FRANCISCO
LOS ANGELES
CLEVELAND
BUFFALO

BAIN WAGON CO.

Main and Pearl Streets
KENOSHA, WIS.

3

PROPOSAL ADVERTISING

Municipal officials will serve their constituents well by seeing that PROPOSALS FOR MUNICIPAL IMPROVEMENTS of all kinds are inserted in

MUNICIPAL JOURNAL, Publication Office, 50 Union Square, NEW YORK



**Use BUFFALO PITTS CO.
TRACTION TRAINS and
HAULAGE OUTFITS**

Send for Art Catalog

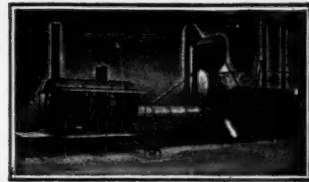
BUFFALO PITTS CO. - - - BUFFALO, N. Y.



Hetherington Railway Asphalt Paving Plant

THE PRODUCT OF 16 YEARS' PLANT BUILDING BY THE ORIGINATORS OF THE FIRST RAILWAY PLANT. IT STILL LEADS.

HETHERINGTON & BERNER INDIANAPOLIS, INDIANA



MUNICIPAL JOURNAL

has no connection with any other periodical and no interest in it is owned by the publishers of any other paper.

Its owners devote their whole time and energy toward making it a reliable and thorough source of current information for those interested in Municipal Necessities.

It is the only weekly in its line and the only publication upon which a thoroughly competent editor and staff of assistants devote their whole time.

If you are in need of special information write

MUNICIPAL JOURNAL 50 Union Square
New York

SANITARY STREET FLUSHING MACHINE CO.

MANUFACTURERS

CARLETON BUILDING

ST. LOUIS, U.S.A.



CUMMER ONE-CAR ASPHALT PLANT

DIRECT HEAT OR STEAM MELTING

GUARANTEED } 2000 Yards two-inch top per day
CAPACITY } 2500 Yards two-inch asphaltic concrete per day

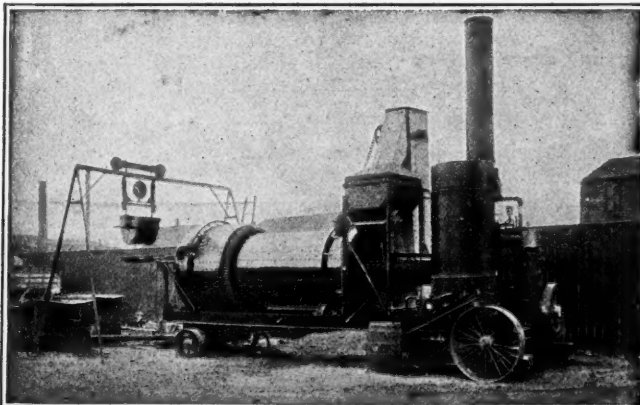
13 Plants Shipped This Year.

One Plant in Stock.

THE F. D. CUMMER & SON COMPANY,

CLEVELAND, OHIO

**Advertise Your Proposals
in MUNICIPAL JOURNAL**



Warren's Portable Asphalt and Repair Plant.

Warren's Portable Asphalt and Repair Plant

Patented July 8, 1913. Others pending.

The Recognized Standard the World Over
REMEMBER

That Warren's Portable Asphalt and Repair Plant is the ONLY one that has ALL of the operations under direct control of the operator, and is the ONLY portable plant which can compete with regular types of asphalt plants in capacity, cost of operation, cost of maintenance and character of products. It does this, and more too; its portability gives it a range of usefulness which is distinctly its own. It is equally adapted to small or large work, was fully perfected by us by practical use in our own business before being offered to the public, and is a full-grown plant built to meet the exacting requirements of the bituminous paving industry.

Put Your Profits Into Your Pocket Instead of Into Repairs
Write for Explanatory Booklets.

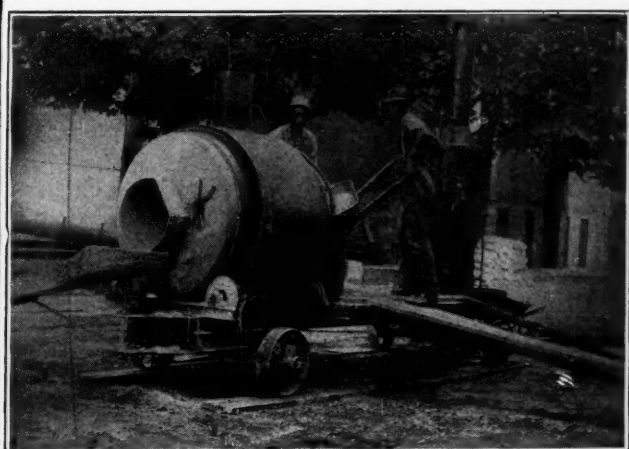
WARREN BROTHERS COMPANY

Executive Offices, 59 Temple Place, Boston, Mass.

DISTRICT OFFICES

NEW YORK, N. Y. 50 Church St.	ST. LOUIS, MO. 409 Pierce Bldg.	ROCHESTER, N. Y. 49 West Ave.
LOS ANGELES, CAL. 926 Calif. Bldg.	PORTLAND, ORE. Journal Bldg.	PHOENIX, ARIZ. 221 Goodrich Bldg.

Manufacturers of All Types of Paving Plants



OLD ASPHALT Remelted and Mixed FOR NEW PAVEMENT

Your Asphalt streets rapidly and cheaply repaired and a permanent pavement produced.

THE RAPID (Heated) MIXER

means a saving of almost 100%. The city of Minneapolis, Minn., laid 60,000 yards 3" Asphalt Macadam pavement with two of our machines without repairs of any kind. THE RAPID MIXER will more than pay for itself in a year in most cities. Write for specifications, prices, etc.

RAPID MIXER COMPANY

84 Porter Block

Grand Rapids, Mich.

Practical Books for Water Works Men

The books described below are recommended
as covering all branches of

Water Works Designing, Construction and Maintenance

PUBLIC WATER SUPPLIES

By F. E. Turneure, Professor Bridge and Sanitary Engineering, and H. L. Russell, Professor of Bacteriology, both of the University of Wisconsin.

This describes the requirements, resources and construction of works for public water supplies and is prepared especially for the engineer, superintendent or other technical man. A chapter on pumping machinery has been contributed by D. W. Meade. This is a reliable and up-to-date treatise on the whole field of water supply, and is believed to be the best book which has yet been brought out on this subject. It is in its second edition; contains about 800 pages. Price, \$5.

TREATISE ON HYDRAULICS

By Mansfield Merriman.

This is the ninth edition of a work which has been a standard text book on the subject of hydraulics for many years. The latest edition has been revised with the assistance of Professor Merriman's son, Thaddeus Merriman. 565 pages. Price, \$4.

WATER WORKS MANAGEMENT AND MAINTENANCE

By Winfield D. Hubbard and Wyncoop Kiersted.

Is probably the only book which deals to the extent of more than 400 pages solely with the operation of a water works system. It is, therefore, especially suitable for the superintendent or manager of a plant. The subject is treated from both the engineering and the business standpoint. Price, \$4.

For the Chemical and Bacteriological Analysis of water and the interpretation of such analyses, we have as standard works

THE EXAMINATION OF WATER

By Professor William P. Mason, of Rensselaer Polytechnic Institute; and

ELEMENTS OF WATER BACTERIOLOGY

By S. C. Prescott, Associate Professor of Industrial Microbiology, Massachusetts Institute of Technology, and C. E. A. Winslow, Associate Professor of Biology, College of the City of New York.

The former book is in its fourth edition. In 167 pages it deals with this subject principally from a sanitary standpoint, with brief reference, however, to mineral and other impurities of no sanitary import. Price, \$1.25. WATER BACTERIOLOGY is in its third edition. Contains about 270 pages, and while it pretends to deal with only the elements of the subject, these elements are treated in a thoroughly scientific manner by experts on the subject. Price, \$1.75.

For Non-Technical Officials or citizens generally who are interested in the subject, there are two excellent books

THE VALUE OF PURE WATER

By George C. Whipple, of Harvard University, and

CLEAN WATER AND HOW TO GET IT

By Allen Hazen, Consulting Water Works Engineer.

The purpose of the former book is to illustrate the fact that impure water affects not only the health and comfort of a community but also the individual pocketbooks of the people. It contains 80 pages and sells at \$1. Mr. Hazen's book is a brief explanation in non-technical terms of why water should be purified, and the more generally used methods and appliances for purifying it. Its object is to set forth first principles for those who have no expert knowledge of the subject. 174 pages. Price, \$1.50.

ORDER FROM

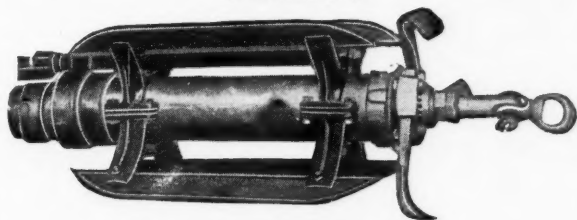
MUNICIPAL JOURNAL

50 Union Square

New York

This is the Machine that Cleaned the Eight-inch Sewers of Marion, South Carolina, for a Cent and a Quarter Per Foot.

If you don't believe it, write to J. M. Johnson, City Engineer of Marion, S. C.



Machines Leased or Contracts Taken

The Turbine Sewer Machine Renovating Company

195 Eleventh Street, Milwaukee, Wis.



MILLER FLUSH-TANK SIPHONS

SIMPLE. RELIABLE. AUTOMATIC

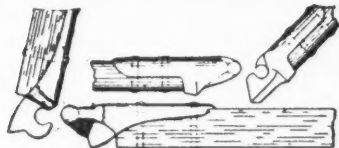
Also SEWAGE DISPOSAL APPARATUS
AUTOMATIC SEWAGE EJECTORS
CENTRIFUGAL PUMP OUTFITS
SEWER JOINTING COMPOUNDS

PACIFIC FLUSH-TANK CO.

CHICAGO

NEW YORK

SEWER RODS The Big Strong Kind



Strong all ways—no weak way like others.

We pay freight and ship for trial. Who else will do it?

W. H. STEWART

1614 Locust St., St. Louis, Mo.

Investigate Stewart's Sewer Cleaning Machine

**A Positive Acting Sewer Cleaning Machine
The Latest Improved Sewer and Conduit Rods**

Machines Leased and Contracts Taken

Ask for Prices

We Will Ship Rods for Trial

The Improved Sewer Cleaning Machine Co.

334½ Twelfth St. W. J. Stevenson, G. M. Milwaukee, Wis.

TWO OLD PROVERBS

"It is wisdom to learn from the experience of others—any fool can learn from his own."

It is the province of this paper to furnish you with the "experience of others" in municipal matters.

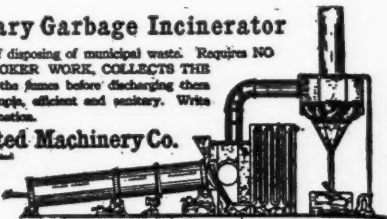
"A word to the wise is sufficient."

The Osborne Rotary Garbage Incinerator

Is the most economical method of disposing of municipal waste. Requires NO EXTRA HANDLING, NO STOKER WORK, COLLECTS THE DUST, scrubs and neutralizes the fumes before discharging them into the atmosphere. It is simple, efficient and sanitary. Write for catalogue and further information.

The Osborne Patented Machinery Co.

120 Liberty Street
New York City



Heenan Destructors

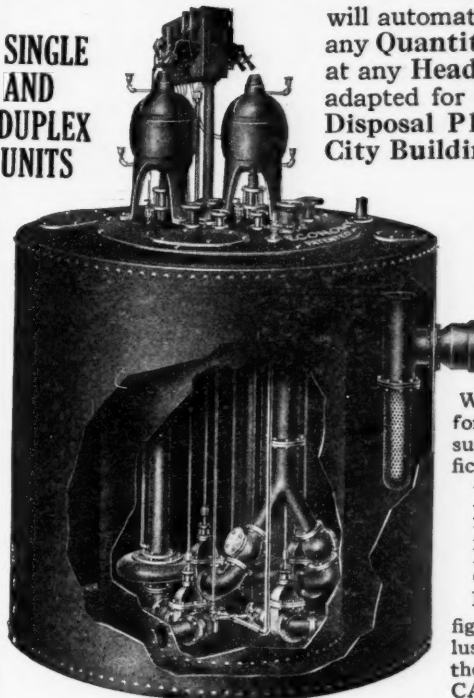
Sanitary and Economical Disposal of City Refuse by most advanced European Method

The Destructor Co., 111 Broadway, N.Y.

Controlling all U. S. patents and rights of Heenan & Froude and Meldrum Bros., Limited

Economy Sewage Ejectors

SINGLE AND DUPLEX UNITS



will automatically Eject any Quantity of Sewage at any Head. They are adapted for Municipal Disposal Plants and City Buildings.

The Economy may be operated by Electricity, Steam or Gas Engine

Write for information and suggestive specification covering

THE
ECONOMY
DUPLEX
DRY PUMP
CHAMBER
EJECTOR

figure 2119 as illustrated and for the ECONOMY CATALOG.

Figure 2119

THOMAS & SMITH, Inc.

Manufacturers

116-118 N. Carpenter Street, Chicago

**Felton's Improved
Couplings for Conduit and Sewer Rods**



MANUFACTURED BY

HAROLD L. BOND CO.

DEALERS IN TOOLS AND MACHINERY FOR ALL FORMS OF CONSTRUCTION WORK

383 R Atlantic Avenue, Boston, Mass.

DECARIE INCINERATORS

THE ONLY SYSTEM THAT HAS STOOD THE TEST OF YEARS IN THE SANITARY AND ECONOMICAL DISPOSAL OF REFUSE

DECARIE INCINERATOR CO
MINNEAPOLIS MINNESOTA



Style Imperial

Electroliers for Curb Lighting

Beautiful in design.
Substantial—carry
from 40 to 100 watt
lamps. ———

500 "Imperials" installed
in Des Moines, Ia.

Many other installations
in the Central and West-
ern States. ———

WRITE FOR CATALOG

McDonnell Iron Works
DES MOINES, IA.



**150
TONS
CASTINGS
PER
DAY**

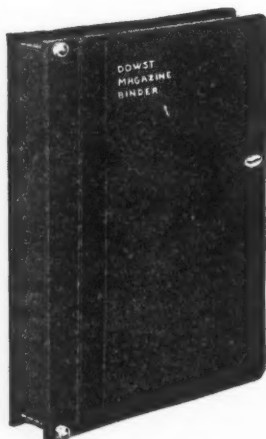
500 DESIGNS

Send for Catalog.

**Largest Producers
in the United States**

**ELMER P. MORRIS
IRON WORKS**

90 WEST STREET, NEW YORK



Binder Closed

Bind Your Copies of Municipal Journal FOR FUTURE REFERENCE

By special arrangement with the manufacturer, we have been able to secure the only practical magazine and periodical binder on the market.

Dowst Magazine Binder

which binds one issue or 26 issues with a neat book appearance. This binder has no springs, catches, strings, clamps, laces or locks, and does not mutilate the periodical in the slightest manner.

No mechanical labor necessary. Simple. Practical. Durable.

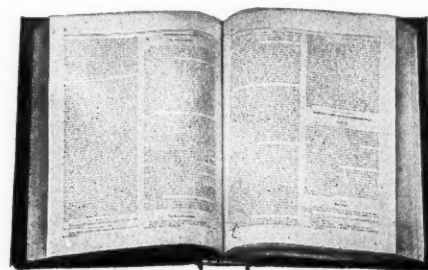
A Positive Guarantee

The manufacturers guarantee to us that every binder is thoroughly tested before it is delivered, and a further guarantee that it will simply and practically accomplish everything claimed for it.

PRICE, POSTPAID, \$1.35

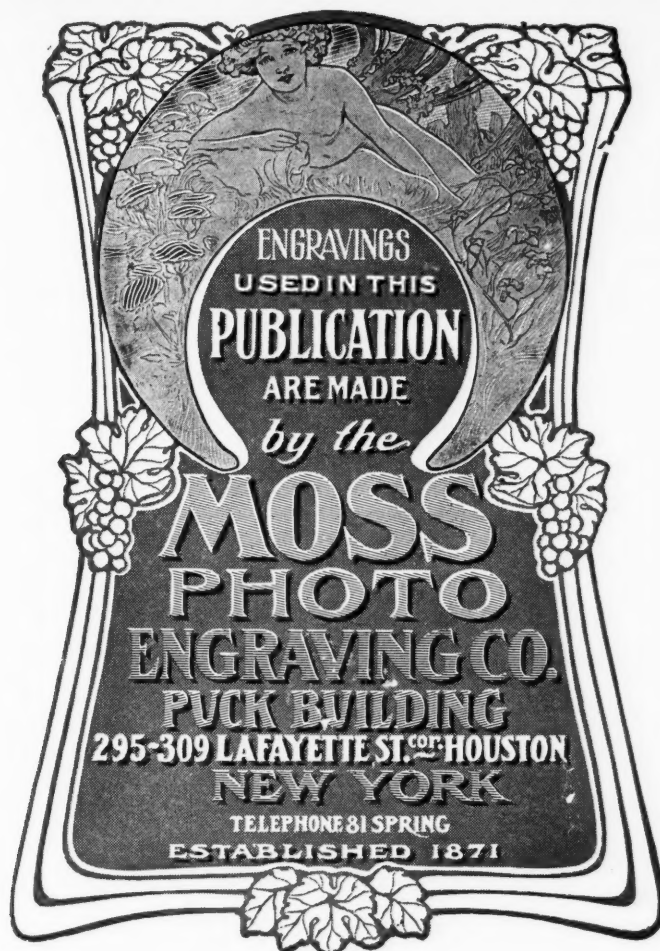
Complete with 27 Binding Rods, 10 Sectional Posts and name of Publication Stamped in Gold on Front Cover.

Send for Illustrated Descriptive Pamphlet.



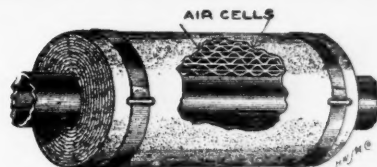
Binder Open

Municipal Journal, 50 Union Square, New York



ENGRAVINGS
USED IN THIS
PUBLICATION
ARE MADE
by the
MOSS
PHOTO
ENGRAVING CO.
PUCK BUILDING
295-309 LAFAYETTE ST. cor. HOUSTON
NEW YORK
TELEPHONE 81 SPRING
ESTABLISHED 1871

Pointers on Pipe Covering



Heat cannot pass through dead or motionless air.

The ordinary air cell coverings used for heating work confine live air and not motionless air—they have large air spaces running from end to end which allow air to travel back and forth. Therefore they do not prevent the loss of any great amount of heat any more than you could keep heat from escaping from a pipe or a radiator in a room by closing all the doors, windows and vents.

J-M ASBESTOCEL Pipe Covering

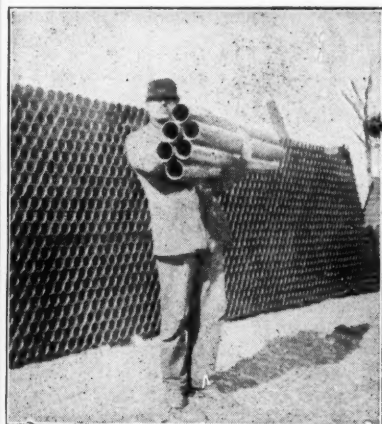
is made on a different principle from all others. The air cells run around the pipe instead of lengthwise. This makes the air spaces so small that there is no place for the air to circulate, and it must be motionless—dead. Consequently, J-M ASBESTOCEL confines a much larger volume of dead air than any other low pressure covering.

If you have hot water or low or medium pressure steam pipes to insulate, compare J-M ASBESTOCEL with all others. You can quickly see that it contains the greatest number of dead air spaces.

Write Nearest Branch for Sample and Catalog No. 100

H. W. JOHNS-MANVILLE CO.

Albany	Cleveland	Louisville	Philadelphia
Baltimore	Dallas	Milwaukee	Pittsburgh
Boston	Detroit	Minneapolis	San Francisco
Buffalo	Indianapolis	New Orleans	Seattle
Chicago	Kansas City	New York	St. Louis
Cincinnati	Los Angeles	Omaha	Syracuse 103



Carrying 30 feet 3-inch Socket Joint Conduit

Orangeburg Fibre Conduit

("Admitted to be the best Fibre Conduit.")

Made in four styles of joints—Socket, Sleeve, Screw and Harrington, with bends and fittings for same. Is the lightest conduit made and means low freight and cartage costs.

Send for The Conduit Book

THE FIBRE CONDUIT COMPANY

103 Park Avenue, New York
1741 Monadnock Building, Chicago
S. B. Condit, Jr., Co., Boston, Mass.
McClary, Jemison Machinery Co.,
Birmingham, Ala.

Tri-Provincial Electrical Supply Co., Winnipeg, Canada.

Main Office and Factory:
Orangeburg, N. Y.

Pierson, Roeding & Co.,
San Francisco, Cal.
Seattle, Wash.
Los Angeles, Cal.
Salt Lake City, Utah
Bryant Zinc Co., Chicago, Ill.

IT WILL PAY YOU

to preserve your copies of

MUNICIPAL JOURNAL

VERY often that article that you read two or three months ago contains just the information you need now—if you could only lay your hands on it. But the issue in which it appeared has been lost.

That needn't happen again. For your convenience we are offering for a limited

time a neat, durable binder to keep your copies at hand and in order. This binder has no complicated parts, and is not heavy and awkward to handle. It is nicely covered with cloth and presents the appearance of a bound book. It takes less than a half a minute to put in a magazine, and no tools are needed.

The price while they last is \$1.35

MUNICIPAL JOURNAL, 50 Union Square, N. Y.

Send me one binder as advertised. \$1.35 enclosed in payment.

Name.....

Address.....



THE PITOMETER COMPANY

220 Broadway

NEW YORK

ABSOLUTE RELIABILITY AND OPERATING ECONOMY ARE THE MOST ESSENTIAL REQUIREMENTS OF

PUMPING ENGINES

The great number of Allis-Chalmers Pumping Engines in continuous service, 365 days a year, demonstrates their **RELIABILITY**.

Official duty tests and published annual reports of station operating costs prove their **HIGH ECONOMY**.

*Is There Any Municipal Problem
of Greater Importance
Than the Water Supply of a City?*

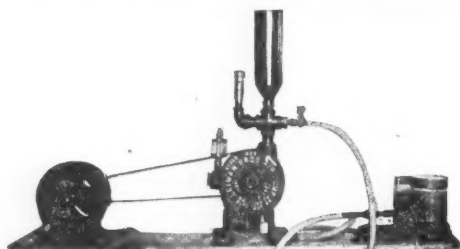
Allis-Chalmers Manufacturing Company

Pumping Engine Department, Milwaukee, Wis.

For all Canadian business refer to
Canadian Allis-Chalmers, Limited, Toronto, Ont.

FOREIGN REPRESENTATIVES

Frank R. Perrot, 883 Hay Street, Perth, W. A.
Frank R. Perrot, 204 Clarence St., Sydney, N. S. W.
H. I. Keen, 732 Salisbury House, London Wall, E. C., England
Mark R. Lamb, 87 Galeria Beeche, Casilla 2653, Santiago, Chile



LEIMAN BROS.' ROTARY

BLOWERS and VACUUM Pumps

furnish air for Laboratory Assaying and Blowing Outfits, Sand Blasting, Forging, Annealing and

VACUUM CLEANING

"They take up their own wear"

BLOWER CATALOG NO. 338. VACUUM NO. 339.

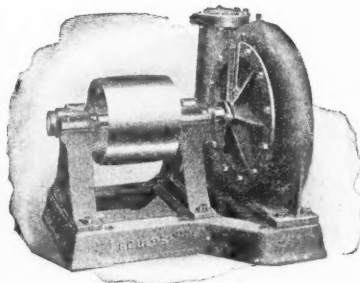
LEIMAN BROS.

62DM JOHN ST., NEW YORK

We also manufacture complete Motor Driven Outfits for Lapidary Work, Polishing Dust Collecting, Sand Blasting, Melting, Soldering, Forging, Annealing, Lathes, Drills, Work Benches.



For Booster Service



For services where the pressure of the city mains is insufficient, use Goulds Centrifugal Pumps and boost the pressure as required.

These pumps are adapted for belt or direct connection to electric motors or other drivers.

Ask for bulletins.



THE GOULDS MFG. CO.
LARGEST MFR. OF PUMPS FOR EVERY SERVICE

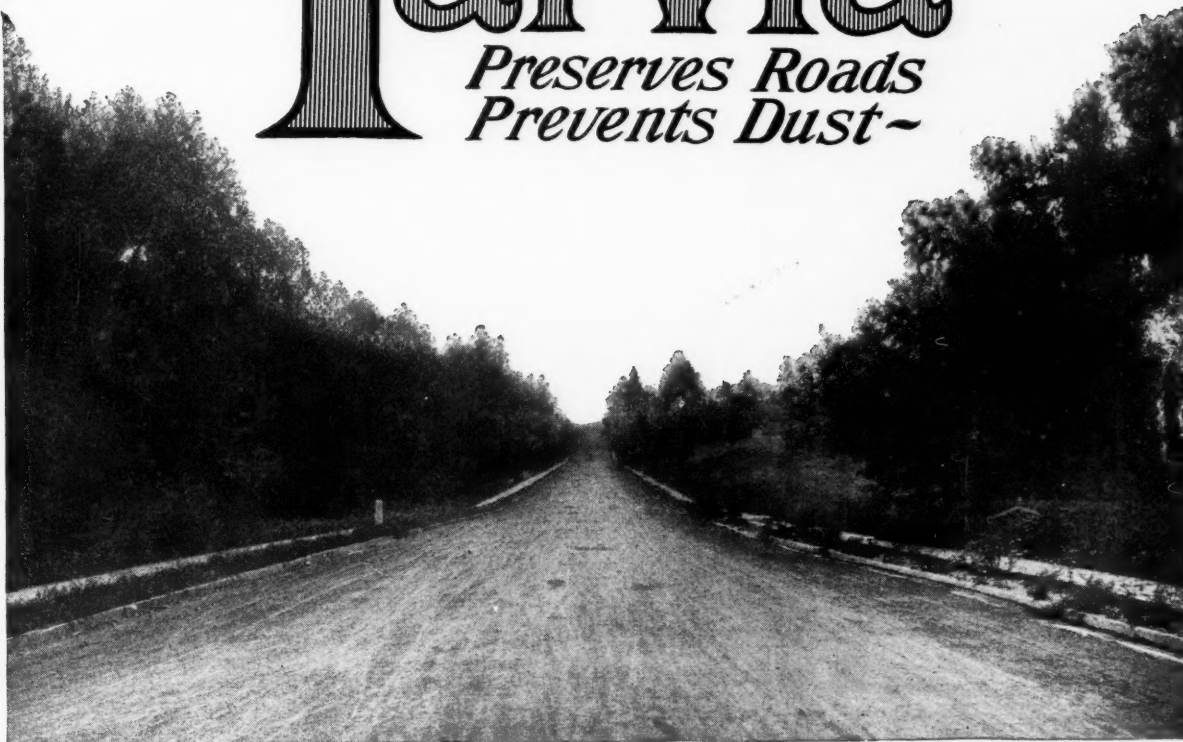
68 W. Fall Street

Seneca Falls, N. Y.

Branches and Agencies in Principal Cities

Tarvia

*Preserves Roads
Prevents Dust~*



Observatory Road, Cincinnati, Ohio. Constructed with "Tarvia X"

Cincinnati's Experience with Tarvia

CINCINNATI began building roads with Tarvia in 1907, when part of Madison Road, the main eastern thoroughfare from the city, was resurfaced with it.

The results were so satisfactory that the tarviated area was extended year by year, and the road has been in such good condition that it was selected for exhibition at the Road Makers Convention in 1912. During these six years the maintenance cost had been trifling, consisting of slight repairs and partial treatments with "Tarvia B".

Erie Avenue, an extension of Madison Road, was resurfaced with "Tarvia X" in 1908. Before that it had required resurfacing every six months. After the Tarvia treatment no maintenance was required until 1912, when some repairs were made and a surface treatment of "Tarvia B" was given.

Grandin Road was tarviated in 1907 and since then has had one surface treatment with "Tarvia B" and other slight repairs.

Burnett Avenue was tarviated in 1908. Two years later it received a surface treatment of "Tarvia B" and is in first-class shape now.

Observatory Road was tarviated in 1909 and was not touched for repairs until 1912, when it received a surface treatment of "Tarvia B" at trifling expense.

All these are important and busy thoroughfares which had a serious maintenance problem before Tarvia was used.

Tarvia is made in three grades—"Tarvia X" is a dense, viscid coal tar product of great bonding power, suitable for building macadam roads; "Tarvia A" and "Tarvia B" are thinner grades suitable for roads already in use, to preserve them and make them dustless.

Booklets on request

BARRETT MANUFACTURING COMPANY

New York Chicago Philadelphia Boston St. Louis Kansas City Cleveland
Cincinnati Minneapolis Pittsburgh Seattle Birmingham
THE PATERSON MFG. CO., Ltd.—Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S. Sydney, N. S.



CONTRACTS AWARDED.

San Diego, Cal.—By City Council, contract for installation of ornamental lamp standards on 3d St. to Howell El. Co., at \$4,330; also for lighting system on F St., to cost \$4,950. City will construct lighting system on 7th St., to cost about \$6,100.

Ellwood City, Pa.—To Harmony Co. to furnish city with electricity for period of 10 years.

Exeter, Pa.—By Borough Council, to Consumers' El. Co., a 60-year franchise in Exeter, for lighting streets of borough for period of 10 years. Contract provides for Westinghouse arc lamps at \$54 each per year.

FIRE EQUIPMENT

Grass Valley, Cal.—Chief C. R. Clinch has petitioned Council to purchase motor combination wagon and other equipment.

Napa, Cal.—Bonds in sum of \$12,000 have been voted for purchase of motor-driven fire engine and other equipment.

Stockton, Cal.—Installation of fire alarm and police system is being considered.

Fairfield, Conn.—At last meeting of Fairfield Fire Department No. 1 matter of placing fire alarm boxes in different sections of town was taken up and discussed. Plan is to have system installed in connection with telephone company. With this in operation alarm will be sounded in various parts of town by bells and whistles and exact location of fire known. It is reported that cost of system will be in neighborhood of \$2,000.

Hartford, Conn.—Additional fire apparatus for southern part of city is being discussed.

Meriden, Conn.—Chief Donovan has recommended purchase of motor combination wagon and establishment of new company.

Washington, D. C.—War Dept. has requested Congress to appropriate \$2,500 for purchase of fire engine and equipment for West Point in lieu of \$3,545 for improvements to soldiers' hospital.

Muscatine, Ia.—A movement looking forward to equipping new Excelsior Fire station in most up-to-date manner will be launched shortly.

Hutchinson, Kan.—Mayor recommends purchase of aerial truck and chief's auto equipped with chemicals.

Indian Orchards, Mass.—Purchase of auto pumping engine to exceed 600 gallons a minute is being considered.

Omaha, Neb.—Residents of northwest and southwest sections of city want new fire engine houses and petitions for issuance of bonds to construct them may be presented to City Council soon. Proposed locations are at 38th and Grand Ave., and 11th and Dorcas.

Far Hills, N. J.—Fire company has asked for purchase of 300 ft. of hose.

Highland Park, N. J.—Council has decided to purchase auto fire engine over veto of Mayor.

Roseland, N. J.—Town Council will issue bonds for purchase of motor apparatus for new fire company.

Sussex, N. J.—Installation of an alarm system is under consideration. Chief Meeker.

Lestershire, N. Y.—Purchase of motor apparatus is contemplated. C. F. Johnson is chief.

Little Falls, N. Y.—Board of Fire Commissioners are discussing purchase of motor apparatus.

Mechanicville, N. Y.—The Howland Chemical Co. No. 5 will purchase motor chemical wagon. R. J. Cowan is chief.

Newark, N. Y.—Purchase of fire truck is being considered. A. N. Christy is Mayor.

Oneida, N. Y.—New fire engine will shortly be purchased for Central Fire Station.

Rochester, N. Y.—Commissioner of Public Safety Charles S. Owen has asked Board of Contract and Supply for motor apparatus for Fire Department. Clerk Frank X. Pifer will advertise for bids for apparatus. The Commissioner asks for one 85-foot motor hook and ladder truck, one gasoline driven patrol wagon for Police Department, and one light delivery wagon for Superintendent of Engines of the Fire Department. He also asks for 1,000 feet of hose for Fire Department.

Schenectady, N. Y.—Fire Chief in annual report recommends purchase of 5,000 ft. of 2½ and 3-in. hose, and auto for deputy chief.

Elizabeth City, N. C.—Board of Aldermen has decided to purchase motor combination chemical and hose wagon for about \$5,500.

Akron, O.—Bonds in sum of \$15,875 for fire and police station signal system will be sold by James McCausland, City Auditor, until 12 noon, January 19.

Farrell, Pa.—Purchase of motor fire apparatus is being considered.

Hazleton, Pa.—Among matters being considered by Councils is purchase of three combination auto fire engines. It is desired that engine be composed of steamer, a chemical and hook and ladder truck, same as are used by many fire companies in larger cities. A machine of that class will cost about \$7,000.

Mahanoy City, Pa.—Council is planning to purchase 1,200 ft. of hose, searchlights, helmets, rubber coats, boots and other equipment.

South Fork, Pa.—South Fork, Portage and East Conemaugh are three Cambria County boroughs considering installation of modern fire alarm system.

Williamsport, Pa.—Resolution has been passed authorizing purchase of 200 ft. of chemical hose for use at No. 2 engine house.

Olneyville, R. I.—Purchase of motor-driven fire truck is being considered.

Newport News, Va.—Fire Chief Stow has stated that he will ask for appropriation in next annual budget to motorize entire apparatus of Fire Dept. Estimated cost will not exceed \$14,000. Chief wants two tractors, one for central station and one for North End station, motor for aerial truck and machine for himself.

CONTRACTS AWARDED.

Mason City, Ia.—To Seagrave Co., for one motor triple combination wagon.

Duluth, Minn.—To United & Globe Rubber Co., of Trenton, N. J., for 4,000 ft. of hose.

New Brunswick, N. J.—By Borough Council of Highland Park, to American-La France Co. for automobile fire engine, at \$8,500.

Greenpoint (L. I.), N. Y.—Greenpoint Fire Department has awarded Star Electric Company of Binghamton, N. Y., contract to install in this village an electric fire alarm system. The Star Company's estimate, \$2,135, being several hundred dollars less than other companies submitting estimates. There will be fifteen boxes, four indicating registers, one bell striker, nine-inch gong in power house, six-inch gong in the residence of the chief of the department and three circuit switchboards.

New York, N. Y.—To R. & L. Co., of New York, local representatives of Garford Co., for two motor tractors for water towers, at \$8,080.

Grand Forks, N. D.—To W. S. Knott Co., of Minneapolis, Minn., for rebuilding ladder truck, at \$700.

Pittsburgh, Pa.—City Architect J. P. Brennan has awarded contract to Morgan & Co., of Homestead, to build fire engine house in North Homestead district of 14th Ward, to cost \$10,500; also to William T. Powell, contract for shelter house to be built at Page and Fulton Sts., North Side, for Playground Association.

Walla Walla, Wash.—To Seagrave Co., contract for motor combination chemical and hose car, at \$5,865.

BRIDGES

Yuma, Ariz.—By order of Supervisors, Yuma has set aside \$1,000, last of \$75,000 fund to build bridge spanning Colorado River at this point to join southern transcontinental highway.

Napa, Cal.—Bonds in sum of \$25,000 have been voted for stone bridge over Napa River.

Portland, Me.—Bids for construction of Orrs Island bridge have been opened but contract has not yet been awarded. Bids were asked on two types of bridge, one with rolling draw and one with swing draw. John W. Gulliver of this city bid on the superstructure and foundation for rolling draw type, \$25,725, and for swing draw type, \$24,525. Bennett Contracting Corporation, another Portland firm, bid only on superstructure, their bid for rolling draw type being \$16,900, and for swing draw, \$19,700.

Lawrence, Mass.—Central Bridge Comm., having decided upon having new bridge of reinforced concrete 80 ft. wide, will engage Benj. H. Davis of New York as Consulting Engr. to draw plans for structure and supervise work of erecting it.

Ithaca, N. Y.—A bridge will be constructed across Cascadilla Gorge just east of Central Ave. bridge, if plans now under discussion by University Grounds Committee are carried out.

New York City, N. Y.—Bridge Commissioner O'Keeffe has announced to the Queens Chamber of Commerce that it was most important that Board of Estimate should grant him immediately the \$2,000,000 which will be needed to prepare Queensboro Bridge and its approaches for operation of new subway system.

Schenectady, N. Y.—The application of the town of Niskayuna for overhead crossing over Schenectady and Troy branch of New York Central and Hudson River Railroad on Vischer Ferry Road has been granted by up-State Public Service Commission. Cost of the structure is estimated at \$43,000. This is to be paid for by State out of barge canal funds.

Mocksville, N. C.—Bridge over Cedar Creek, which is one of system of bridges in work now going on in Davie Co., has been surveyed for and plans are now complete. Bridge is to be 128 ft. long and will have four 32-ft. spans.

Lima, O.—Five companies entered bids for \$20,700 worth of 6 per cent. bridge bonds, and awards just made give bulk to Spitzer-Rorick Co., of Toledo.

Portland, Ore.—Bonds in sum of \$1,250,000 will be sold for construction of Columbia River interstate bridge.

South Bethlehem, Pa.—Grand Jury has filed its report approving report of Board of Viewers on matter of proposed free bridge over Lehigh River to connect Bethlehem, with proviso that liability of Northampton County for its contribution toward payment for bridge shall not exceed \$100,000.

Chattanooga, Tenn.—Repairs on Walnut St. bridge across Tennessee River, costing approximately \$100,000, will be considered by special bridge committee of Co. Court, Dec. 23.

Dallas, Tex.—Preparatory to ordering county bond election for Jan. 22, same date as city charter election, County Commissioners' Court has instructed County Engineer, J. F. Witt, to prepare surveys and cost estimates for paving of Dallas-Oak Cliff viaduct and for construction of three new bridges, one to cross Trinity south of Dallas, one to cross Elm Fork west of Carrollton, and one to cross West Fork of Trinity three miles northeast of Grand Prairie.

San Antonio, Tex.—That work of building and rebuilding bridges in Bexar County may be accomplished more expeditiously under \$200,000 bond issue for bridges and that no mistakes be made in construction, County Commissioners have employed Terrell Bartlett as consulting engineer to county.

Waco, Tex.—Date of next election will shortly be fixed. Taxpayers will vote on bond issue for building permanent bridges and sewers.

Seattle, Wash.—Council has passed resolution placing before voters proposition of authorizing construction of bridge over Lake Washington Canal at Montlake Boulevard.

Milwaukee, Wis.—Matter of issuing \$375,000 for construction of bridge over Milwaukee River at Wright St., has been discussed and \$75,000 has been voted for preliminary work.

CONTRACTS AWARDED.

Mobile, Ala.—By Bd. of Revenue & Rd. Comrs., for creosoted wooden bridge over Deer River, to J. W. Gilbert, at \$3,050.

Oskaloosa, Kan.—By Board of Commissioners of Jefferson County for substructure of an 80-ft. reinforced concrete bridge, to McKeenan & Dell, Manhattan, Kan.

Oskaloosa, Kan.—By Comrs. of Jefferson Co., to A. G. Brown Struct. Co., St. Joseph, Mo., for constructing 80-ft. span reinforced concrete bridge.

Boston, Mass.—To Holbrook, Cabot & Rollins Corp., 6 Beacon St., Boston, at \$36,910, for substructure, approaches and temporary bridge over Neponset River at Granite Ave.

Kansas City, Mo.—To A. Kleinhoffer, Kansas City, Mo., at \$5,026, contract for four culverts from Lone Jack east to Cunningham Rd.

Stockville, Neb.—By Board of Commissioners of Frontier County, contract for repair and construction of all county bridges during 1914, to Standard Bridge Co., Omaha, Neb.

Cincinnati, O.—By Dept. of Pub. Serv., contract for Hopple St. viaduct, to Kirchner Constr. Co., 221 W. Ninth St., at its bid of \$413,765. Work consists entirely of reinforced concrete. H. M. Waite is Ch. Engr.

JOHN BAKER, JR.
Star Brand
CALIFORNIA ASPHALT

BEST FOR PAVING AND ROAD BUILDING

New York Office
WHITEHALL BUILDING, 17 Battery Place

ROOM 920. Telephone, Rector 4388

Chicago Office
ROANOKE BUILDING, 9 South La Salle Street

Telephone, Randolph 7216

Representatives Throughout United States and Canada.

Write For Particulars



GLUTRIN.
REG. U. S. PAT. OFF.

Under date of October 28, 1913 a well-known New Jersey road official writes us as follows:

"I take pleasure in testifying that it has more than filled my expectations and I can say, most conscientiously that in my opinion, glutrin is the best and most economical binder and dust retarder for gravel roads that I know, or ever heard of."

We will be glad to send full copy of this letter upon request.

Robeson Process Company

General Offices

PENNINGTON, NEW JERSEY

MISCELLANEOUS

Napa, Cal.—Bonds in sum of \$4,000 have been voted for purchase of four acres at Jack's Bend, in Napa River, to straighten channel.

Oakland, Cal.—Municipal bonds in sum of \$750,000 have been sold.

San Francisco, Cal.—Bids for 5 per cent. bonds amounting to \$1,183,000 will be opened by Board of Supervisors. Tomorrow's offering consists of \$308,000 of City Hall and civic center bonds and \$875,000 of new issue of Municipal Railway bonds. All are of \$1,000 denomination with exception of \$70,000 of Municipal Railway bonds, which are of \$100 denomination.

Stockton, Cal.—Installation of new police and fire alarm system is being considered.

Denver, Colo.—The day for special election at which taxpayers will vote on \$3,000,000 bond issue for construction of Moffat tunnel under James Peak has been fixed for Feb. 17 in bond ordinance introduced by Mayor J. M. Perkins at special meeting of City Council.

Columbus, Ga.—Installation of police alarm system is under consideration.

Normal, Ill.—Improvement bonds in sum of \$10,500 have been awarded to N. W. Halsey & Co. of Chicago.

Fort Wayne, Ind.—General plans for improvement of river channels in Fort Wayne and nearby territory, by which it is hoped to prevent recurrence of disastrous floods of last March have been presented in detail to citizens' flood prevention committee, Consulting Engr. A. W. Grosvenor and City Engr. Frank M. Randall. Scheme contemplates widening and raising of practically every bridge in city, including seven railroad bridges, construction of dikes and retaining walls, and dredging of river channels.

Richmond, Ind.—Installation of modern street cleaning and sprinkling system is recommended.

Muscatine, Ia.—Bids will be advertised early in 1914 for construction of new City Hall. Estimated cost \$70,000.

Donaldsonville, La.—Board of Commissioners of New River Drainage District will meet at Gonzales to issue bonds

voted in district, and levy tax to provide revenue for payment of same. Bonds, aggregating \$175,000, will be issued in two series, one of \$105,000 secured by acreage tax, and other of \$70,000 secured by ad valorem tax. Drainage project includes dredging and cleaning of New River for twenty-five miles and similar work in other bayous and streams.

Fall River, Mass.—Construction of new central police station is being considered.

Haverhill, Mass.—Plans are being considered for improvements to city hall.

Holyoke, Mass.—Bids have been opened for playground \$25,000 bond issue the bonds going to Merrill, Oldham & Co., of Boston, whose bid was 100.829, a little above par.

Lowell, Mass.—Plans will be prepared for new steel filing cases at city hall.

Lowell, Mass.—Appropriation of \$4,000 has been ordered for purchase of auto ambulance.

Duluth, Minn.—Last issue of \$50,000 park bonds have been approved.

Carthage, Mo.—Petitions are being circulated asking that County Court hold election, if \$50,000 city bonds carry, to vote \$120,000 for court house in Joplin; \$60,000 for county jail in Carthage; \$60,000 for new building at county farm, and \$60,000 for sanatorium for treatment of county tuberculars.

St. Joseph, Mo.—Plans and specifications of Harry L. Colton and Ralph H. Oliver of Chicago have been accepted in competition for new \$30,000 city hall.

Belleville, N. J.—Bond issue of \$100,000 to cover the cost of Belleville Town Hall has been authorized at meeting of Town Council. Town Attorney John De Graw has been instructed to have necessary papers prepared for consideration in near future.

Newark, N. J.—Eleven bidders competed for purchase of \$700,000 of new market bonds, bearing 4½% interest, at city hall. Kean, Taylor & Co., of 30 Pine St., New York, were successful ones, their offer being \$103.75.

Albany, N. Y.—Fifty-one million dollars of first four and a half per cent. canal and highway bonds will be sold by State during latter part of January.

They will not be subject to either state or federal taxes. There will be \$30,000,000 canal bonds, constituting last of \$101,000,000 originally provided for and \$21,000,000 highway bonds.

Charlotte, N. Y.—Erection of new jail is being considered.

Lockport, N. Y.—Bd. of Fire Comrs. will take up proposition of buying auto trucks for city.

Lockport, N. Y.—It is expected that at next meeting of Common Council City Engr. Frehsee, in compliance with directions given him by Aldermen, will submit plans for installation of garbage disposal and incinerator plants in this city as result of action taken several months ago by Council.

Waterloo, N. Y.—New jail will be erected at cost of about \$50,000.

Wilmington, N. C.—People of this city are now considering proposed establishment of municipally owned wharf facilities to accommodate increasing traffic of the port.

Akron, O.—Bonds in sum of \$15,875 for police and fire station signal system will be sold by James McCausland, City Auditor, until 12 noon, January 19.

Albany, Ore.—The Linn Co. Pomona Grange has petitioned City Council of Albany to establish public market.

South Bethlehem, Pa.—Installation of police alarm system is advocated.

Chattanooga, Tenn.—Resolution providing for concrete wall along road up Missionary ridge is to be introduced at January term of county court asking that court authorize expenditure of enough money to make this work possible. Proposed wall will run about 700 ft. along outside of road that climbs ridge from Chattanooga. It will be built of concrete.

Newport News, Va.—Fire Chief Stow has been authorized at meeting of Fire and Water Com. of Common Council, to see various automobile agents of city with view of purchasing a machine.

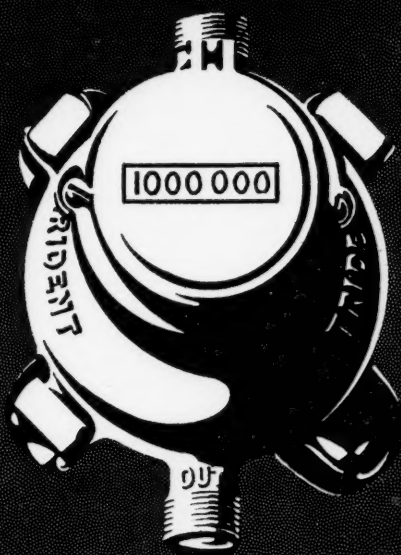
Janessville, Wis.—Purchase of police auto is asked for by Chief of Police E. H. Ransom.

Milwaukee, Wis.—Bond issue of \$250,000 has been voted for new central police station.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS				
N. Y.	Lockport	Dec. 29	Paving, 1,700 yds.	City Clerk.
Wash.,	Port Angeles	Dec. 30	Street improvement	C. E. Shields, City Clerk.
Pa.	Beaver	8 p.m., Dec. 30	Paving, 23,900 sq. yds.; grading, 4,500 cu. yds.	Secy. Boro.
Tex.	Waco	10 a.m., Dec. 30	Paving, 15,000 sq. yds.; excavating, 2,500 cu. yds.; curb & gutter, 7,000 lin. ft.	J. W. Foster, Comr. Streets.
O.	Cheviot	noon, Jan. 7	Labor and material for improving street	Village Clerk.
O.	Cincinnati	noon, Jan. 16	Retaining wall and road improvement	Bd. Co. Comrs.
S. D.	Sioux Falls	9 a.m., Jan. 26	Paving, 18,000 sq. yds.	W. C. Leyse, City Aud.
Wis.	Fond Du Lac	Feb. 1	Cement paving, 3 miles	J. W. Forrester, Comr. Sts.
SEWERAGE				
Ill.	Champaign	11 a.m., Dec. 27	Hauling, trenching, back-filling tile in drainage district	Engineer.
Utah	Provo	10 a.m., Dec. 28	Sewer work, 947.5 ft.	F. Evans, City Recorder.
Minn.	Crookston	10 a.m., Dec. 29	Constructing ditch; cost, \$10,163.	H. J. Welte, Co. Recorder.
Wis.	Fond du Lac	3 p.m., Dec. 30	Constructing sanitary sewer	J. F. Hohensee, City Clk.
D. C.	Washington	2 p.m., Jan. 2	Constructing sewers	Ch. Clk., Engr. Dept., Dist. Bldg.
Ia.	Garner	1 p.m., Jan. 2	County drains (tiles)	W. L. Fitkin, Aud.
Tenn.	Gainesboro	Jan. 3	Sewers, 1,000 ft.	M. J. Dixon, Ch. Com.
Minn.	Montevideo	8 p.m., Jan. 5	Sanitary sewer, 2,142 ft.	A. M. Parks, City Clk.
Mo.	Memphis	Jan. 5	Vitrified pipe sewer; cost, \$20,000.	Rollins & Westover, Engrs., Kansas City.
Minn.	Wabasha	Jan. 27	Constructing sewerage system	J. M. Schouweiler, Vil. Rec.
Mont.	Butte	5 p.m., Mar. 1	Sanitary sewer	W. A. Willis, City Clk.
WATER SUPPLY				
Tenn.	Gainsboro	Jan. 3	Construction of two meter water tanks, pipe, etc.	M. J. Dixon, Ch. Com.
Wis.	Oconomowoc	4 p.m., Jan. 6	Fire well	W. F. Moldenhauer, Chman.
LIGHTING AND POWER				
Wis.	Hudson	Dec. 26	Lighting city and pumping water, 5 years	E. E. Denniston, City Clk.
FIRE EQUIPMENT				
N. J.	Red Bank	Jan. 5	Two automobile pump fire engines	Boro. Clerk.
BRIDGES				
S. D.	Gann Valley	noon, Jan. 6	Constructing bridges and repairs	W. H. Abernath, Co. Recorder.
MISCELLANEOUS				
Va.	Norfolk	10 a.m., Dec. 30	Sanitary water still; felt roofing	Bur Sup., Navy Dept., Wash., D. C.
D. C.	Washington	10 a.m., Dec. 30	Silent chains, gears, pinions, springs, etc.	T. J. Cowie, Paymaster Gen., U. S. N.
Ia.	Garner	1 p.m., Jan. 2	Tile, 3,800 ft.	W. L. Fitkin, Aud.
Miss.	Kosciusko	11 a.m., Jan. 5	Culvert pipes	X. A. Kramer, Engr., Magnolia.
N. D.	Forman	2 p.m., Jan. 6	Culverts for 1914	C. E. Fouts, Co. Aud.
Cal.	Mare Island	10 a.m., Jan. 6	Steel pipe	Pay. M. Gen., Navy Dept., Wash., D. C.
N. D.	Crafton	2 p.m., Jan. 7	Metal culverts	O. M. Fraser, Aud.
Cal.	Mare Island	10 a.m., Jan. 13	Cast iron pipe, fittings and valves	J. T. Cowie, Pay. M. Gen. U. S. N., Wash., D. C.



TRIDENT

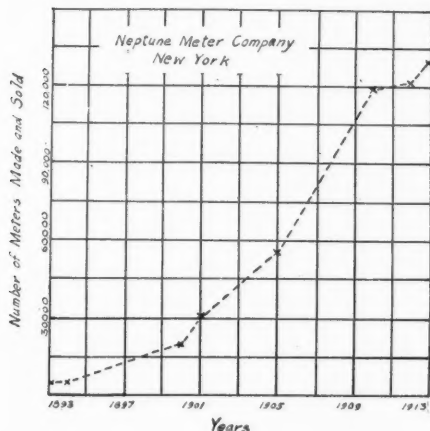
Send for a Copy of E. W. Bemis's
Water Meters

II. THE PROGRESS OF METERING.

The meter is recognized. It is estimated from the statistics published by Municipal Journal that there are about four million meters in use in the country and that the number increases yearly at the rate of about 10.5 per cent.

A meter must prove by strenuous and conclusive tests that it excels in the three great qualities:

1. Reliability. Powerful, durable materials.
2. Accuracy.
3. Accessibility. Easy installation, inspection and repair.



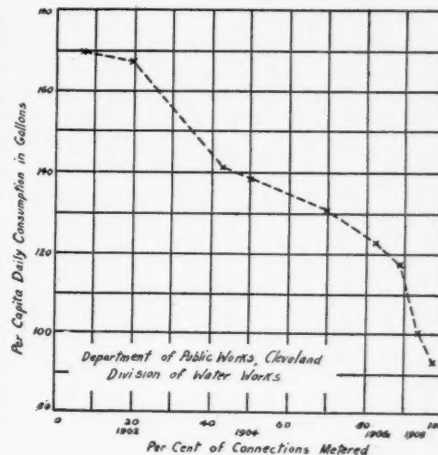
meter progress in the country. The reason is that Trident fulfilled the three requirements.

1. A Trident piston, unbreakable because of its unique thrust roller. The gears are cut for durability and resistance. The repair cost is a minimum.
2. All Trident bushings of hard rubber—non-corrosive and friction reducing—precise readings.
3. Trident units interchangeable—facility of handling.

The Trident has stood up in all metering conditions—every service has its Trident. The city of Cleveland has the best record of any American city for reduction of water waste. Cleveland has over 40,000 Trident meters. Metering will reduce water waste. The Trident has proved it.

I. THE WAR AGAINST WATER WASTE.

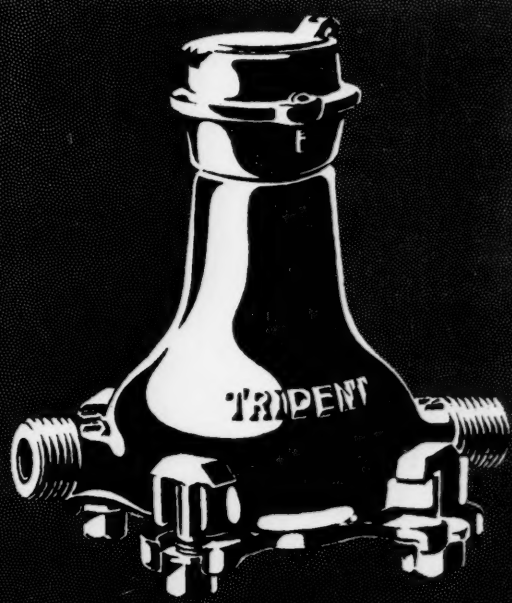
A constantly increasing need for a greater water supply is bringing water works officials face to face with the problem of conservation—a choice between enormous expenditure for new sources and plants or checking the fearful waste. Against every \$2 to \$5 needed for a definite increased supply by means of pumping stations, mains, filtrations, water sheds, etc., \$1 will conserve a similar amount by means of metering. Washington, D. C., faced an expenditure of \$5,000,000 for an additional aqueduct, but achieved the same result by metering at a cost of \$819,000.



The most efficient, the greatest single effective method of reducing waste is by means of meters. City after city is proving this and no offsetting troubles have been found.

From the official reports of the Water Works of Cleveland, Ohio, this curve shows the relation between the percentage of connections metered and the corresponding per capita consumption for the years 1901-1909. The increase in metering is obviously followed by a decrease in waste. Any other metered city will show the same result. Metering will reduce water waste and save expenditures.

The curve of results is almost mathematical—it is only natural that it should be so. One might as well argue against the law of gravitation or the multiplication table.



TRIDENT

Neptune Meter Company
90 West Street, New York

STREETS AND ROADS

Yuma, Ariz.—Yuma County's surveyors have agreed that \$100,000 of proceeds of \$500,000 road bond issue recently voted and shortly to be sold shall be expended in making first class highway from Yuma to Maricopa County line near Agua Caliente. Present road from Yuma to Maricopa line is 114 miles long. It angles northward through Castle Dome range and thence south toward Agua Caliente. New road will be 80 miles long. Instead of crossing Gila River at Dome it will cross on new concrete bridge at Antelope hill, for which contract will be let in few days. Thirteen bids for building bridge have been received. They are now in hands of State Engineer Lamar Cobb, who will forward his recommendation in few days. He says bridge will cost between \$40,000 and \$50,000.

Sacramento, Cal.—Delegates from various civic bodies of city, together with Supervisors of Yolo, Sacramento and Solano Counties, will appear before California Highway Commission January 22 in effort to have bonds for Yolo Basin project placed on market immediately. Sale of bonds will insure rapid completion of new highway through this territory.

Bridgeport, Conn.—Following are propositions on which city engineer has been asked to furnish Streets and Sidewalks Committee with estimate of cost: Grading of Alpine St., Woodside Ave., Edna Ave., Ash St., certain sections of North Ave., Monroe St., Scofield Ave., Merchant St., Eaton St., Madison Ave., Crown St., Hawley Ave., Fairfield Ave., from Main to Lindley St.; Beers St., Fairmount Ave. and Bronx Ave. Laying of bituminous macadam pavements on Pembroke St., Arctic St., Clinton Ave., Wood Ave., Myrtle Ave., West Ave., and John St., from Courtland St. to West Ave. Laying of permanent pavements on Howard Ave., from State St. south to the harbor; Spruce St., from Howard to Wordin Ave., and Seaview Ave. from Barnum to Stratford Ave. Special: Construction of cobble gutters on both sides of Boston Ave., from Boston Terrace to Seaview Ave.

Bridgeport, Conn.—Widening of Housatonic Ave., from East Washington Ave. to Meadow St. is being considered.

Alexandria, La.—Bonds in sum of \$40,000 have been sold. Funds are to be used for extending street paving, sewer, water and electric light service.

Billings, Mont.—Actual work on Gulf-National-Parks trail decided on at recent good roads meeting in Denver will begin by spring.

Antwerp, N. Y.—Proposition calling for appropriation of \$15,000 has been voted for street improvements.

Brooklyn, N. Y.—Petitions are being considered for various street improvements in New Lots District.

Long Island City (L. I.), N. Y.—Following street work has been planned: Howland St., from Hoyt Ave. to Woolsey Ave., \$10,000; Congress Ave., from Laurel Hill Boulevard to Clifton Ave., \$14,000; De Bevoise Ave., from Borden Ave. to Clinton Ave., \$13,000; Clifton Ave., from Borden Ave. to Clinton Ave., \$26,900; Montgomery Ave., from Borden Ave. to Columbine Ave., \$10,800; Joy Ave., from Laurel Hill Boulevard to De Bevoise Ave., \$32,900; Waters Ave., from Laurel Hill Boulevard to De Bevoise Ave., \$16,960; Jones Ave., from Laurel Hill Boulevard to De Bevoise Ave., \$13,600; Townsend Ave., from Laurel Hill Boulevard to De Bevoise Ave., \$11,600; and Gossman Ave., from Gould Ave. to Borden Ave., \$35,200; Carolin Ave., from Gould to Borden Ave., \$16,000; Bliss St., from Gould Ave. to Borden Ave., \$14,700; Borden Ave., from Laurel Hill Boulevard to De Bevoise Ave., \$23,100; also Hancock St., from Cypress Ave. to Myrtle Ave., \$2,200.

Youngstown, O.—Trumbull County Commissioners will be asked for an improved road from Johnston to Kinsman.

Marshfield, Ore.—At meeting of Coos County Good Roads Association it was decided to petition county court to call special election to vote on issuing \$400,000, five per cent., six-year road bonds. It was agreed that of total \$100,000 shall be used on road from Bandon to Curry County, \$70,000 on road to Ten Mile lakes and \$270,000 on Myrtle Point to Roseburg Road, which will be made a trunk line to interior. It is proposed to put down hard surface roads.

Clarksville, Tenn.—Bonds in sum of \$30,000 have been voted for street paving purposes.

Sioux Falls, S. D.—Resolution has been adopted for paving and improving Phillips Ave. Bids will be asked for one of following pavements: Granite block, creosoted wood block, asphaltic concrete, bitulithic, Portland cement concrete or dalarway.

Belton, Tex.—Bell County Commissioners have ordered election for Precinct 5, including certain divisions of Precincts 4 and 6, for purpose of voting on issuance of \$600,000 bonds for building of county roads. Election will be held January 15.

Houston, Tex.—Now that County Commissioners' Court has sold \$1,000,000 bond issue voted in February last for good roads a campaign of remarkable activity is being shaped to open early in new year in way of construction. Bonds brought par and accrued interest and were sold to Harris Trust & Savings Bank of Chicago, delivery to be completed by February 1, 1914.

McKinney, Tex.—Good roads bond issue of \$450,000 has been carried.

San Antonio, Tex.—Resolution has been passed ordering specifications prepared for paving of Travis, West Commerce and parts of other streets.

Salt Lake City, Utah.—A decision relative to calling election to decide whether Salt Lake County shall issue bonds for construction of roads will be made about January 1, according to announcement made by O. W. Carlson, Chairman of County Commissioners.

Spokane, Wash.—Petition for extension of new Palouse highway from end of present contract to Rockford has been finally completed by Frank W. Guilbert, secretary of Spokane County Good Roads Association, and petition filed with County Commissioners.

Tacoma, Wash.—County Commissioners have explained to committee of Stellacoom residents and officials plans of Special Engr. C. H. Healey and County Engineer M. R. Thompson for building road around gravel pit in North End addition to Stellacoom so that gravel industry would not be interrupted and cheaper road could be constructed. County has title to right-of-way for street across gravel district just outside Stellacoom and in path of proposed Tacoma-Stellacoom boulevard. New plan contemplates route avoiding gravelly area and providing grade not in excess of 5 per cent. Cost will run to approximately \$10,000, but will be much less than previous estimates on old location for road.

CONTRACTS AWARDED.

Bakersfield, Cal.—By Board of Supervisors of Kern County, contract to A. B. Robinson, at \$2,600, for constructing part of road No. 304, known as Maricopa Ventura Road.

PROPOSALS

TENDERS FOR STEEL PIPES.

Ottawa, Canada.

Sealed tenders in duplicate addressed one copy to the City Clerk, City of Ottawa, Canada, and the other to Sir Alex. Binnie Son & Deacon, St. Stephens House, Westminster, London, England, and endorsed "Tenders for steel pipe" will be received until 4 p. m. on Tuesday the 3rd February, 1914, for about forty-two miles of steel pipes, fifty-four inches internal diameter, about thirty-two miles of steel pipe fifty-eight inches internal diameter, and about eleven miles of steel pipe, fifty-one inches internal diameter.

Forms of tender and specifications may be obtained from Sir Alex. Binnie Son & Deacon, St. Stephens House, Victoria Embankment, London, S.W., or from the City Engineer of Ottawa, on and after the fifteenth on receipt by them of a cheque to the value of five hundred dollars made out to the City Treasurer of the City of Ottawa, Canada, which sum will be returned on receipt of a bona fide tender.

The lowest or any tender is not necessarily accepted.

No tenders will be considered except from actual manufacturers capable of supplying the whole of the pipes within a period of two and one-half years from the date of acceptance of the tender.

Dated December 4th, 1914.

SIR ALEX. BINNIE SON & DEACON,
Engineers in Chief,

St. Stephens House, Westminster,
London.

"Information on future contracts
furnished"

Charles F. Murphy, Jr.

76 William Street, New York City

Telephone 4560 John

Contractors' Bonds and Liability Insurance
Our Specialty.

Advertise
Your
Proposals
In
Municipal
Journal




BESSEMER BLOCK

THE MOST UNIFORM SHALE PAVING BLOCK MADE

Makes a Uniform Pavement that is Durable, Sanitary and Always in Repair

BESSEMER LIMESTONE COMPANY, Youngstown, O.



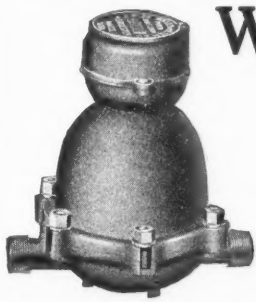
PITTSBURGH METER CO.
General Office and Works:
East Pittsburgh, Pa.
Sales Offices:
New York, 149 Broadway
Chicago, 337 W. Madison St.
Kansas City, 6 W. Tenth Street
Columbia, S. C.,
1230 Washington Street
Seattle, 115 Prefontaine Place
Also Manufacturers of
EUREKA Water Meters,
Cast Iron and Tin Gas
Meters, Positive and Pro-
portional Gas Meters for
any pressure, and Meter
Provers.
Write for Catalogue 119

**Can You Repair Frozen Meters
For 50 Cents?**



If you are paying more—
you are paying too much.
**BADGER METERS
With Frost Plates**
Are unconditionally guaranteed
against damage from freezing ex-
cept the occasional breaking of
a Frost Plate.
**BADGER METER
MANUFACTURING CO.**
261-265 Third St., Milwaukee, Wis.

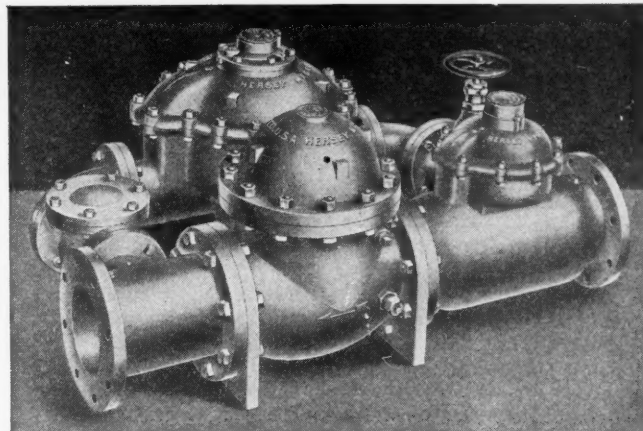
**Efficiency in
Water Meters**



Let us tell you about
the various types we
manufacture.
UNION WATER METER COMPANY
WORCESTER, MASS.

**WATCH DOG
WATER METERS**
Maintain the Revenue
WRITE FOR CATALOGUE
GAMON METER CO., Newark, N. J.

**Dependable Service Products, Water Works Brass
Goods, Curb Boxes, Etc.**
Payne's Patent Tapping Machines. Most easily
operated. Sent at our risk on 30 days' trial.
HAYS MANUFACTURING COMPANY ERIE, PA.



**STOP WHOLESALE LOSS! Use the
HERSEY DETECTOR METER**
ON FIRE AND MANUFACTURING SERVICES

THIS IS THE ONLY METER
Endorsed by Water Departments and Underwriters,
Because it registers all large flows.
Because it registers all small flows.
Because it does not obstruct the flows.

HERSEY MFG. COMPANY
Main Office and Works: SOUTH BOSTON, MASS.
Boston, Mass.: 714 Tremont Temple. Columbus, O.: 211 Schultz Bldg.
Philadelphia: The Bourse Buffalo, N. Y.: 806 White Bldg.
Chicago, Ill.: 10 South La Salle St. Atlanta, Ga.: 3d Nat. Bank Bldg.
San Francisco: 461 Market St. Los Angeles: Union League Bldg.
New York City: 174 Fulton St.

"ALL KINDS OF METERS FOR ALL KINDS OF SERVICES"
500,000 SOLD

**AMERICAN and NEW NIAGARA
WATER METERS**



SPECIFICATIONS.
Dirt and Sand Proof
Submerged Bearings. Re-
inforced Measuring Disc.
Jewel and Pivot Bearing
Gears. Regulator for
Pressures. Only Seven
Submerged Working
Parts. These and other
features explained in new
catalog.

BUFFALO METER CO.
Established 1892
290 Terrace, Buffalo, N. Y.

Coffin Valve Company
Boston, Mass.
Manufacturers of the Largest Sluice and Gate Valves
in America.
Gates of any type for any pressure, and hydraulically and
electrically operated. Write for Bulletin 12.

FILTERS
Hypochlorite Apparatus and Water Softening Plants
The New York Continental Jewell Filtration Company
111 Monroe Street, CHICAGO 15 Broad Street, NEW YORK
Owners of the NEGATIVE HEAD FILTER PATENTS



FIELD INSTRUMENTS

FOR
Civil Engineers
— and —
Land Surveyors

Catalogue Sent on Request

W.&L.E. GURLEY

TROY, N. Y.

Branch Factory:
315 MARITIME BLDG., SEATTLE, WASHINGTON

SECURITY SEWER RODS

Send for Catalog No. 15.



The only Rods that joint and unjoint easily and quickly and cannot buckle in the duct. Light weight, long runs easily handled, no slack and lend themselves to all practicable bends.

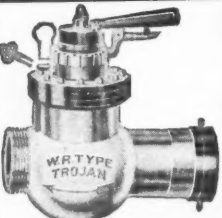
Three ft. Rods, 55c. each. Four ft. Rods, 65c. each.
THE F. BISSELL COMPANY, TOLEDO, OHIO

OUR NEW SYSTEM OF TREATING GARBAGE IS ADAPTED FOR SMALL TOWNS AND CITIES. IT IS ABSOLUTELY SANITARY AND ODORLESS. IT SAVES ALL OF THE BY-PRODUCTS.

The C. O. BARTLETT & SNOW COMPANY

CLEVELAND, OHIO

N. Y. Office, No. 50 Church St. Canadian Office, Lake of the Woods Bldg., Montreal, Ont.



The Ross Independent Combination Operating and Regulating Valve

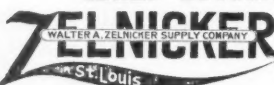
Can be attached to any High Pressure Hydrant. It protects Firemen and enables Shut-off Nozzles to be used on any high pressure line. Write for specifications and prices.

ROSS VALVE MFG. CO., Troy, N. Y.

ZELNICKER SEPTEMBER 84-Page BULLETIN

Now Ready! Get it Before Buying or Selling

RAILS—LOCOMOTIVES—CARS, Etc.



**PILING
DRAG LINES
EQUIPMENT of all kinds**

"PUMPS 3500 GALLONS PER HOUR"

Continuously day and night at a cost of BUT 25c. per working day.

\$105.00 on skids (net)

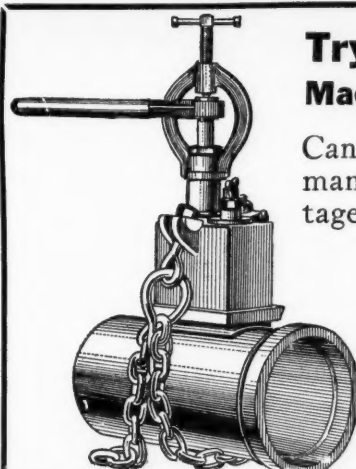


Our FIVE DAY FREE TEST will prove it saves you \$10 to \$20 per day.

Eureka Machine Company, Lansing, Mich.

Index to Advertisements

A	Page	K	Page
Aetna Engineering Bureau.....	32	Kimball, J. H.....	32
Allis-Chalmers Mfg. Co.....	12	Kimberley, A. Elliott.....	32
Alvord & Burdick.....	32	Koehring Machine Co.....e. o. w.	—
American Cast Iron Pipe Co.....	—	L	
American Ingot Iron Culverts.....	—	Lamson, John S., Jr.....	4
American-LaFrance Fire Eng. Co.	36	Leadite Co., Inc.....	31
American Tel. & Tel. Co.....	—	Lederle & Provost.....	32
Artesian Well & Supply Co., o.a.m.	—	Lehigh Portland Cement Co.....	4
Austin Western Road Mach'y Co..	—	Leiman Bros.....e. o. w.	12
B		Link-Belt Co.....	—
Bache, J. W. & Co.....	31	Littleford Bros.....	—
Badger Meter Mfg. Co.....	29	Loper Fire Alarm Co.....e. o. w.	36
Bain Wagon Co.....	6	Lynchburg Foundry Co.....	—
Baker, John Jr.....	25	M	
Barber Asphalt Paving Co.....	2	Marine Metal & Supply Co.....	33
Barber Asphalt Pav. Co., Buffalo..	4	Massillon Iron and Steel Co., The.	—
Barr Clay Co.....o.a.m.	—	McAvoy Vit. Brick Co.....o.a.m.	—
Barrett Mfg. Co.....	23	McDonnell Iron Works.....e. o. w.	10
Bartlett, C. O. & Snow Co.....	30	McKenna, Chas. F.....	32
Bessemer Limestone Co.....	588	McWane Pipe Works.....	—
Bissell, The F. Co.....	30	Mauzy, Dabney H.....	32
Bond, Harold L., Co.....	9	Merritt Hydraulics Co.....	32
Boyd, James & Bro., Inc.....	36	Metropolitan Paving Brick Co....	3
Broadway Central Hotel.....	—	Modern Iron Works.....	31
Brossman, Chas.....	32	Morris Iron & Steel Co.....	31
Bucyrus Company.....	—	Morris, Elmer P., Iron Works.....	10
Buffalo Meter Co.....	29	Morse, W. F.....	32
Buffalo Pitts Co.....	6	Moss Photo-Engraving Co.....	11
Buffalo Steam Roller Co.....	4	Murphy, Chas. F., Jr.....	888
Burns & McDonnell.....	32	N	
C		National Corrugated Culvert Mfg.	—
Caird, James M.....	32	Co.....	—
Cameron Septic Tank Co.....	32	National Paving Brick Mfg. Asso..	—
Cast Iron Pipe Mfrs.....	—	Neptune Meter Co.....	27
Central Foundry Co.....	1	New Departure Mfg. Co.....	—
Chapin, L. E.....	32	New York Continental Jewell Fil-	29
Chicago Concrete Mch'y Co.....	—	tration Co.....	—
Christ, E. H.....	32	O	
Clearfield Brick Mfg. Co.....	3	Ohio Quarries Co.....	4
Clermont Sewer Pipe Co.....	3	Okonite Co.....o.a.m.	—
Clip-Bar Co.....	—	Osborne Patented Machinery Co..	9
Clow, James B., & Son.....	—	P	
Coffin Valve Co.....	29	Pacific Flush Tank Co.....e. o. w.	9
Cook, A. D.....	—	Pacific Reduction Co.....	32
Cravath, James R.....	32	Parker, A. A.....e. o. w.	—
Cumberland Hotel.....	31	Patterson, Clay Products Co.....	3
Cummer, F. D., & Son Co.....	7	Pease, F. A., Engineering Co.....	33
Cutter Co., George.....	—	Pennsylvania Salt Mfg. Co.....	31
D		Pittometer Co.....	12
Dayton Rubber Mfg; Co.....	35	Pittsburgh Meter Co.....e. o. w.	29
Decarie Incinerator Co.....	9	Portsmouth Culvert Co.....	—
Deckman Duty Brick Co., o.a.m.	—	Potter, Alexander.....	33
Destructor Co., The.....	9	Potts, Clyde.....	33
Donaldson Iron Co.....	—	R	
Dolarway Paving Co.....	—	Rapid Mixer Co.....	7
Douglas & McKnight.....	32	Robeson Process Co.....	25
Dow & Smith.....	32	Rochester Motor Fire Pump Co...	—
Draeger Oxygen Apparatus Co....	35	Ross Valve Mfg. Co.....	30
Duluth Engineering Co.....	32	Russell Grader Mfg. Co.....	—
Dunn Wire-Cut Lug Brick Co....	3	S	
Dustoline.....	4	Safety Insulated Wire & Cable Co.	3
E		Sanitary Street Flushing Machine	—
Elite Mfg. Co.....	5	Co.....	7
Engineering Agency.....	—	Seagrave Co.....	35
Equitable Asphalt Maintenance	—	Sessions, E. O.....	33
Co., The.....	5	Simplex Valve & Meter Co.....	—
Eureka Fire Hose Mfg. Co.....	36	Smith, A. P. Mfg. Co.....	31
Eureka Machine Co.....	30	Smith, T. L., Co.....	—
Evans & Howard Fire Brick Co...	—	Standard Asphalt & Rubber Co....	4
F		Standard Cast Iron Pipe & F'dry Co	—
Fabric Fire Hose Co.....	36	Standard Oil Co.....	2
Fibre Conduit Co.....	11	Star Electric Co.....	35
Firestone Tire & Rubber Co.....	36	Stewart, W. H.....	9
Flickinger Iron Works, Inc.....	—	Stuart, E. B.....	33
Flour City Ornamental Iron Wks	—	Studebaker Corporation, The.....	6
Port Wayne Electric Works, o.a.m.	—	T	
Fritz Mfg. Co.....e. o. w.	—	Taylor, Henry W.....	33
Front Drive Motor Co.....	—	Thomas & Smith.....e. o. w.	9
Fuller, George W.....	32	Thomson Meter Co.....e. o. w.	—
G		Thornton Fire Brick Co.....o.a.m.	—
Gamewell Fire Alarm Teleg. Co..	35	Tracy, L. D.....	33
Gamon Meter Co.....	29	Triumph Voting Machine Co.....	—
Glamorgan Pipe & Foundry Co...	—	Trussed Concrete Steel Co.....e. o. w.	—
Goodrich, B. F., Co.....	34	Turbine Sewer Machine Renovating	9
Goodyear Tire & Rubber Co.....	—	Co.....	—
Goulds Mfg. Co.....	12	U	
Gulick-Henderson Co.....	32	Union Water Meter Co.....	29
Gurley, W. & L. E.....	30	U. S. Asphalt Refining Co.....	2
H		United Gas Improvement Co.....	4
Hatton, T. Chalkley.....	32	U. S. Wood Preserving Co.....	—
Hays Mfg. Co.....	29	Universal Portland Cement Co....	—
Hazen & Whipple.....	32	Universal Road Machinery Co....	4
Hering, Rudolph. & Gregory, John	32	Utica Pipe Fdry Co.....	—
Hersey Mfg. Co.....	29	W	
Hetherington & Berner.....	3 & 7	Wadsworth Stone & Paving Co....	4
Holzbog, Geo. H., & Bro.....	35	Warner-Quinlan Asphalt Co.....	2
Hotchkiss Lock Metal Form Co...	3	Warren Bros. Co.....	7
Howard, J. W.....	32	Watson Wagon Co.....	6
Howe Engine Co.....o.a.m.	—	Watson, Wilbur Jr., & Co.....	33
I		White Company, The.....	—
Improved Sewer Cleaning Machine	—	Wise & Watson.....	33
Co., The.....	9	Witmer & Brown.....	33
Indian Refining Co.....	—	Wood, R. D., & Co.....	—
International Motor Co.....	—	Wyckoff Pipe & Cressoting Co....	3
J		Y	
Johns-Manville Co., H. W.....	11	Yellow Pine Mfra.' Association....	—
Johnson & Fuller.....	32	Z	
		Zelnicker, Walter A., Supply Co..	30



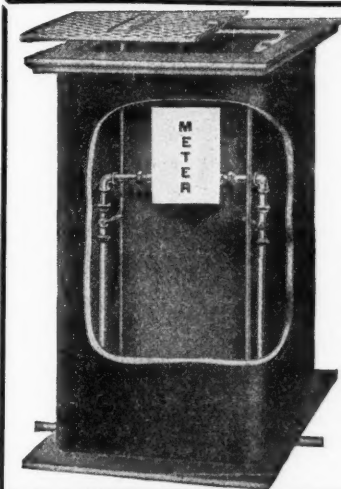
Try this Tapping Machine at our Risk

Can be carried by one man—a great advantage when you find openings are to be made.

Let us send one and a few samples of our Brass goods on trial.

The A. P. Smith Mfg. Co.

EAST ORANGE, N. J.



ECLIPSE Meter Box

Cast Iron and Vitrified Tile

Requires no brick laying or masonry. One man can install without special tools. A Complete Meter Box. Protects meters from frost, durable, sightly.

Write for folder today

MODERN IRON WORKS

QUINCY, ILL.

CHLORIDE OF LIME

AND

LIQUID CHLORINE

FOR

Water and Sewage Purification

Pennsylvania Salt Mfg. Co.

PHILADELPHIA, PA.

TRADE "LEADITE" MARK

Registered U. S. Patent Office

A User Says:—

"Had very good success in using Leadite. I used it on about ten miles of pipe. I figured that it saved me on the cost of material and labor at least 50%."

Leadite lessens labor. It fills every crevice from the yarn out to face of bell. No caulking required. The efficient water main joint.

Write for booklet.

Specify Leadite.

"Leadite Joints Increase in Strength with Age."

THE LEADITE CO., Inc.

LAND TITLE BUILDING,

PHILADELPHIA, PA.

HOTEL CUMBERLAND

NEW YORK

Southwest Corner Broadway at Fifty-fourth Street

Near 50th Street Subway Station and 53d Street Elevated. "Broadway" Cars from Grand Central Depot; Seventh Avenue Cars from Pennsylvania Station.



**Headquarters for
Municipal Officials
Engineers and
Contractors**

**New and Fireproof
Strictly First-Class
Rates Reasonable**

All hardwood Floors and
Oriental Rugs

10 Minutes' Walk to Thirty Theatres

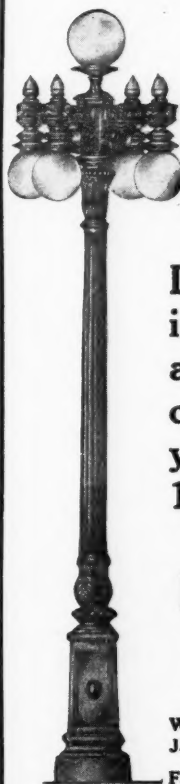
Transient Rates **\$2.50** with Bath and up
Excellent Restaurant Prices Moderate

Only New York Hotel window-screened throughout

Send for Booklet

HARRY P. STIMSON, Formerly with Hotel Imperial

"Experience is the Best Teacher"



200 Cities are using our
Lighting Standards. The
data in connection with
them is at your command

**If you want your streets
illuminated effectively
and with Standards of
correct design, let us give
you the benefit of our
15 years of experience.**

Morris Iron & Steel Co.

J. W. BACHE & CO.

General Eastern Sales Agent,
50 Church St., New York

W. ST. CLAIR JONES, 79 North St., Boston, Mass.

J. QUARLES, 617 Munsey Bldg., Baltimore, Md.

Factory and Executive Offices, FREDERICK, MD.

30707

Directory of Consulting Engineers Engaged in Municipal and Public Works

AETNA ENGINEERING BUREAU

Civil Engineers, Surveys, Estimates, Valuations, Reports, etc. Particular attention given to street pavements, sewerage and water supply system. Surveys for steam and electric railways.
SPECIAL ASSESSMENT EXPERTS,
 Suite 700, 17 North La Salle St., Chicago.
 Telephone Franklin 898

ALVORD, JOHN W. CHAS. B. BURDICK

Consulting Engineers
 Reports, Investigations, Plans and Specifications for Water Supplies, Water Purification, Water Power, Sewerage, Sewage Disposal.
 Hartford Building CHICAGO

BROSSMAN, CHAS.

SPECIALIST
 Waterworks, Sewerage, Sewage Disposal
 Merchants' Bank Bldg., Indianapolis, Ind.

C. S. BURNS R. E. McDONNELL,
 M. Am. Soc. C. E. M. Am. Soc. C. E.
 Mem. New Eng. Water Wks. Ass'n.
 Mem. Western Soc. of Eng.

BURNS & McDONNELL

Civil, Hydraulic and Sanitary Engineers
 Specialties: Waterworks, Sewerage and Sewage Disposal.
 Electric Lighting and Water Power.
 804-23 Scarritt Bldg. Kansas City, Mo.
 Both Phones 1339 Main.

CAIRD, JAMES M.

Assoc. Am. Soc. C. E.
 Chemist and Bacteriologist.
 Office and Laboratory,
 271 RIVER STREET. TROY, N. Y.
 Water Analysis and Tests of Filter Plants

Cameron Septic Tank Co.

CONSULTING ENGINEERS.
SEWAGE DISPOSAL
 Sole Owners of U. S. Patent covering the
SEPTIC PROCESS
 352 Menadnock Block, CHICAGO, ILL.

CHAPIN, L. E.

M. Am. Soc. C. E.

Engineer

Frick Building, Pittsburgh, Pa.

**Water Works, Water Power
and Sewage Disposal**

WRITE HIM

CHRIST, E. H.

Civil Engineer
 Paving, Sewerage, Bridges, etc.
 Norris Bldg., GRAND RAPIDS, MICH.

CRAVATH, J. R.

Specialist in
 Street Lighting
 Public Utility Management
 1649 Marquette Building, CHICAGO

Douglass & McKnight

CIVIL ENGINEERS

1709 Union Bank Bldg., Pittsburgh, Pa.
 Bell Phone 1109 Court
 Surveys, Estimates and Reports
 Special Attention Given to Street Paving
 Sanitary Sewerage and Water Supply

DOW & SMITH

CHEMICAL ENGINEERS

Consulting Paving Engineers
 A. W. Dow, Ph.B. F. P. Smith, Ph.B.
 Mem. Am. Inst. Ch. Engrs.
 Mem. Am. Soc. Civ. Engrs.
 Asphalt, Bitumens, Paving, Hydraulic
 Cement, Engineering Materials.
 131-3 East 23rd St., NEW YORK.

DULUTH Engineering Co., The

W. B. PATTON, M. Am. Soc. C. E.
 Ex-City Engineer, Duluth, Manager
MUNICIPAL ENGINEERS
 Waterworks, Sewerage, Electric Lighting
 Town Planning
 Suite 612-616 Palladio Bldg.
 DULUTH, MINN.

FULLER, GEORGE W.

Hydraulic Engineer and Sanitary Expert
 Water Supply and Purification, Sewerage
 and Drainage, Disposal of Sewage and
 Refuse, Investigations of Epidemics, Water
 Works Valuations, Supervision of Con-
 struction and Operation.
 Associate: James R. McClintock.
 170 BROADWAY, NEW YORK CITY

GULICK-HENDERSON COMPANY

Municipal Engineers and Chemists
 Testing of Paving and Road Materials, Rubber
 Hose, etc. Inspection of Materials for Public Works
 525-529 Third Ave., Pittsburgh
 Manhattan Bldg., Chicago, Ill.
 30 Church St., New York, N. Y.
 444 Market St., San Francisco, Cal.

Hatton, T. Chalkley

M. AM. SOC. C. E.
CONSULTING ENGINEER
 Examinations, Surveys and Reports Made
 Plans and Specifications Prepared and
 Construction Superintended for Proposed
 Systems of Water Supply, Drainage,
 Sewerage and Sewage Disposal and
 Improved Street Pavements.
 WILMINGTON, DEL.

HAZEN & WHIPPLE

CIVIL ENGINEERS

Water Supply, Sewerage, Hydraulic and
 Sanitary Problems, Reports, Plans, Con-
 struction, Operation, Efficiency Tests,
 Valuations, Rates.
 30 East 42nd Street, New York City

HERING & GREGORY

Consulting Engineers & Sanitary Experts
 Water Supply and Water Purification, Sew-
 erage, Sewage Disposal and
 Refuse Disposal
 Rudolph Hering John H. Gregory
 Charles Saville
 170 Broadway, New York City

Pavements and Roads

Specifications, Qualities of Materials
 Chemical Analyses and Tests
 Inspection, Etc.
 Write for Circular
 J. W. HOWARD, Consulting Engineer,
 1 Broadway, New York

JOHNSON & FULLER

Consulting Engineers and Sanitary Experts
 Water Supply, Sewerage, Water and Sewage
 Purification. Design, Supervision of Con-
 struction and Operation, Valuations, Im-
 provement of Existing Works.
 George A. Johnson, Wm. B. Fuller,
 M. Am. Soc. C. E. M. Am. Soc. C. E.
 Harold C. Stevens, Assoc. M. Am. Soc. C. E.
 150 Nassau Street, New York

KIMBALL, J. H.

M. Am. Soc. C. E.
CONSULTING ENGINEER.
 Investigations, Designs, Supervision of Construc-
 tion, Sewerage, Sewage Disposal, Water
 Supply, Municipal Works.
 414-415 Louisville Trust Bldg., Louisville, Ky.

Kimberly, A. Elliott

Hydraulic and Sanitary Engineer
 8 East Long Street,
 Columbus, Ohio
 Sewage Disposal
 Water Purification
 Industrial Waste Treatment

LEDERLE & PROVOST

**SANITARY EXPERTS AND
HYDRAULIC ENGINEERS**
 Water Supply, Sewage Purification
 Andrew J. Provost, C. E., New York City
 A. B. Hansen, B. S., 39-41 West 38th St.

MCKENNA, CHAS. F., Ph.D.

Consulting Chemist and
 Chemical Engineer, Specializing in
QUALITIES OF MATERIALS
 Asphalts, Cements, Metals, Paints, Etc.
 50 Church St. New York City

MAURY, DABNEY H.

Member Am. Soc. C. E. and
 Mem. Soc. M. E.
 Investigations, Reports, Design and Super-
 intendence Water Works, Power Plants,
 Sewerage, Land Drainage and Appraisal
 of Public Utilities.
 1137-8 Menadnock Block, Chicago, Ill.

Philadelphia, Pa. 120 N. Broad Street.

MERRITT HYDRAULICS CO.

Engineers, Contractors & Manufacturers.
 Priestman Pneumatic Ejectors, Priestman Nat-
 ural-Compound Pumping System, Automatic
 Sewage Lifts, Merritt Siphons for flush tanks, and
 all classes of Sewage Disposal Apparatus and Ro-
 tary Screens. Descriptive catalogues on request.

MORSE, WILLIAM F.

Consulting Sanitary Engineer
 90 West St. New York
 Surveys, Reports, Specifications, Proposal
 forms for Disposal of Waste of Munic-
 ipalities, Institutions and Business Estab-
 lishments, Designs for Special Furnaces
 for any purpose. Expert Investigation and
 Reports on Any Question of Waste Col-
 lection or Disposal

PACIFIC REDUCTION COMPANY

Conservation and Disposal of all
 City Wastes
 29 South La Salle Street
 CHICAGO

Directory of Consulting Engineers Engaged in Municipal and Public Works

PEASE, THE F. A., ENGINEERING CO.

Civil and Consulting Engineers
Municipal Improvements, Subdivisions,
Electric Railways

8th Floor, Marshall Bldg., Cleveland, O.

Potter, Alexander

50 Church St.
New York City
Civil and Sanitary Engineer
Specialties:
Water Supply, Sewerage and Pavements

POTTS, CLYDE

Civil and Sanitary Engineer
Sewerage and Sewage Disposal Works
Hydraulic, Water Works, Filtration
Reports, Plans and Estimates

SESSIONS, E. O.

CONSULTING ENGINEER

Reports, Appraisals, Examinations,
Designs, Plans and Specifications for
Light, Power and Water Systems.
Efficiency and Illumination.

Fellow A. I. E. E. Member: A. S. M. E.
Member: I. E. S. A. Member: A. S. C. E.

Marquette Building, CHICAGO

STUART, E. B.

REVOLUTIONARY METHODS

Of Garbage, Sewage and Refuse Disposal and
Collection

U. S. Representative International Or-
ganic Fertilizer Company
36 South Ashland Boulevard, Chicago

Albany, N. Y.

100 State Street

TAYLOR, HENRY W.

HYDRAULIC & SANITARY ENGINEER

Water Supply Water Purification
Sewerage Pumping Plants
Sewage Disposal Drainage

Reports, Estimates, Plans, Supervision of
Construction and Operation

TRACY, L. D.

Assoc. Mem. Am. Soc. C. E.

Civil and Sanitary Engineer

Examinations, Surveys and Reports Made
Plans and Specifications Prepared for
Sewerage and Sewage Disposal
Roads and Pavements

245 Fourth Ave. Pittsburgh, Pa.

Watson, Wilbur J. & Co.

CLEVELAND, O.

Expert Bridge Engineers. Consultation,
Designs, Examination and Reports upon
existing structures.

Reinforced Concrete or Steel

Southern Office, Charlotte, N. C.

J. F. WITMER C. W. BROWN, C. E.
Mem. Am. Soc. C. E.

WITMER & BROWN

Hydraulic and Sanitary Engineers.

Chapin Block, Buffalo, N. Y.

SPECIALTIES

Municipal Water Supply and Sewage
and Refuse Disposal. Garbage
Reduction.

WISE & WATSON

Civil and Consulting Engineers and
Surveyors, 34 Bloomfield Av., Passaic, N. J.

Collin R. Wise, Mem. Am. Soc. C. E.

Robert M. Watson

Sewerage, Sewage Disposal, Waterworks
Municipal Improvements
Land Surveying, Etc.

FOR SALE CHEAP

Wrought Pipe, second hand, all sizes, recut
and rethreaded suitable for all classes of
work. Prices quoted on application.

MARINE METAL & SUPPLY CO.

167 South Street, New York City

REAL BARGAINS

We do not want to Store the Four
Hundred Pieces of

Contractors' Equipment

consisting of Air Compressors, Hoist-
ing Engines, Boilers, Locomotive
Cranes, 70 Ton Bucyrus Shovels,
Pumps, Pipe, Rails, Crushers, Etc.,
Etc., from the Thos. McNally Aqued-
uct Contract. No Reasonable Offer
Refused.

E. B. LEAF CO.

HARRISBURG PA.

STANDARD BOOKS ON HIGHWAY CONSTRUCTION

Expositions of Best Practices by the Most Competent Authorities.

TEXT-BOOK ON HIGHWAY ENGINEERING

The most up-to-date and comprehensive text on the
subject. Deals with surveying and design; founda-
tions; materials; advantages and costs of all types of
construction; administration and legislation.

Price, \$4.50 net.

Arthur B. Blanchard, C. E.

and

Henry B. Drowne, C. E.,

Columbia University

HIGHWAY ENGINEERS' HANDBOOK

Pocket book for use of all engaged in road construc-
tion. Special tables and curves. Composition of
materials. Cost data and specifications. Details of
construction.

Price, \$3.00 net.

Wilson G. Harger

and

Edmund A. Bonney

New York State Department of
Highways.

STREET PAVEMENTS AND PAVING MATERIALS

Valuable manual for use of students, engineers and
city officials. Methods and materials of construc-
tion.

Price, \$4.00 net.

Geo. W. Tillson, C. E.,

Consulting Engineer to Borough of
Brooklyn.

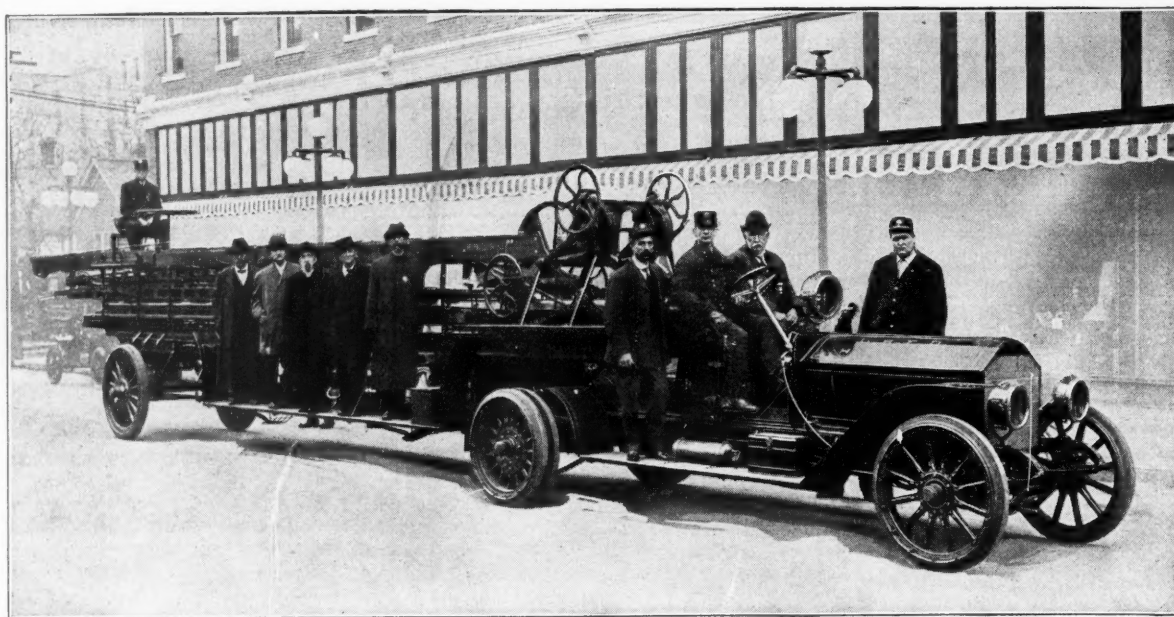
SPECIFICATIONS FOR STREET ROADWAY PAVEMENTS

Detailed forms and tests for specifications of con-
struction and materials. Instructions to inspectors
on paving work.

Price, \$1.00.

S. Whinery, C. E.

Order from MUNICIPAL JOURNAL, 50 Union Square, New York



In Real Fire-Fighting Service—

The Little Rock, Arkansas, Fire Department put this American La France Hook and Ladder Truck into service last April. It is equipped with

GOODRICH WIRELESS TRUCK TIRES

For Motor Fire Apparatus

The truck had been at work over six months when this picture was taken. The tires do not show any signs of having been through a half year of fire department service.

**What Goodrich Wireless Tires Are Doing
For Little Rock They Will Do For You**

Factories:
Akron, Ohio

The B. F. Goodrich Company

Branches in All
Principal Cities



DECEMBER 25, 1913

MUNICIPAL JOURNAL

WEEKLY

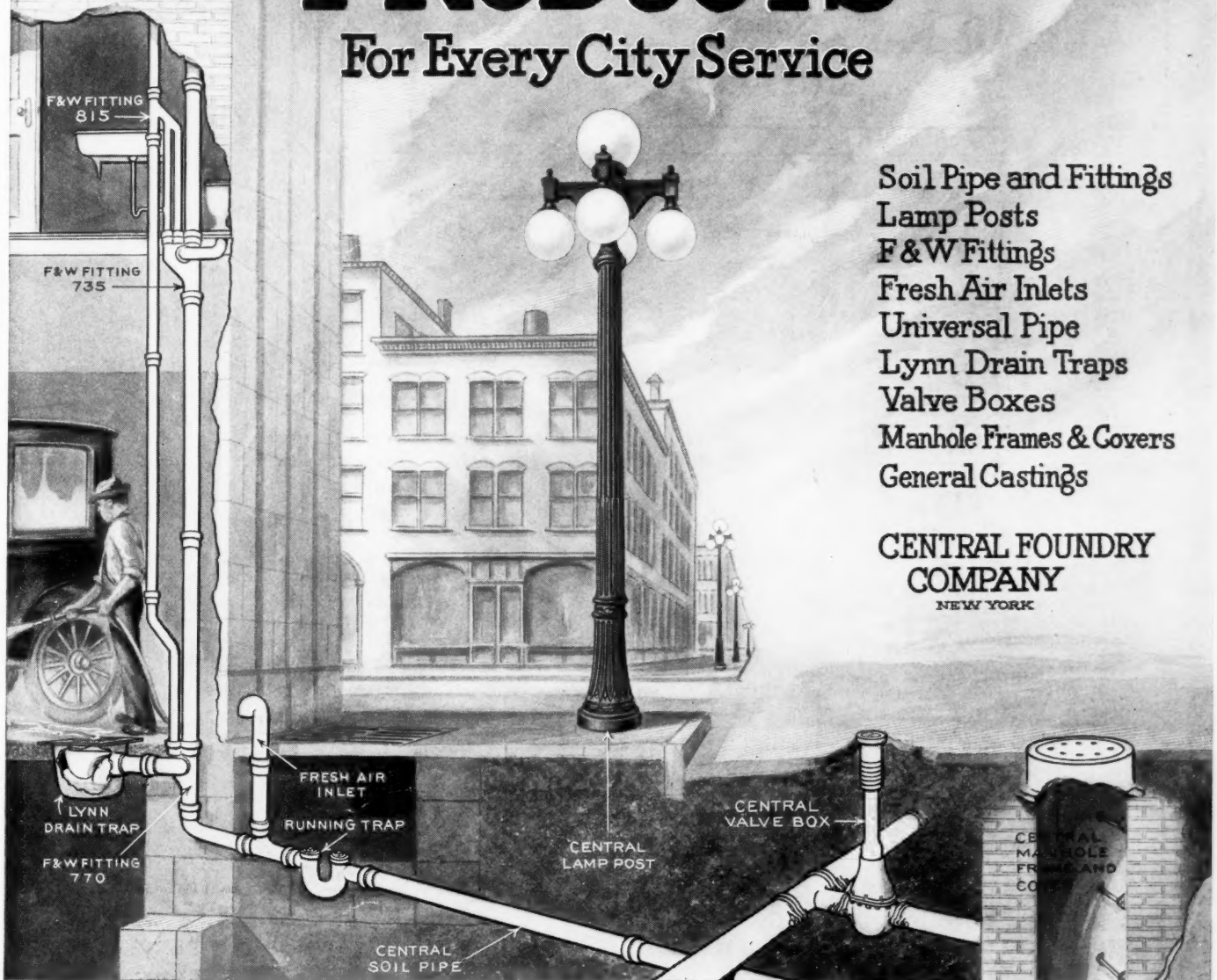
VOLUME XXXV.
No. 26

50 UNION SQUARE, NEW YORK

\$3.00 a year
10c. a copy.

CENTRAL FOUNDRY PRODUCTS

For Every City Service



Soil Pipe and Fittings
Lamp Posts
F&W Fittings
Fresh Air Inlets
Universal Pipe
Lynn Drain Traps
Valve Boxes
Manhole Frames & Covers
General Castings

CENTRAL FOUNDRY
COMPANY
NEW YORK

AZTEC LIQUID ASPHALT

For oiling roads

It should not be confused with either heavy residual sludges or ordinary dust layers.

It possesses the quality of thoroughly penetrating the interstices of a macadam roadway and binding the stone, combining the features of a DUST LAYER and ROAD PRESERVATIVE.

One application each season will suffice.

**The United States
Asphalt Refining Co.**

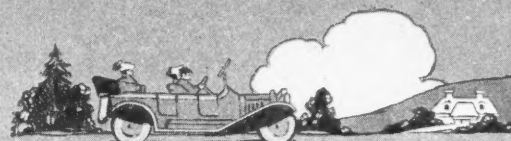
90 West Street, New York

MONTEZUMA ASPHALT

REFINED TO MEET ALL
STANDARD
SPECIFICATIONS



CONTAINS 99.8% PURE BITUMEN
SUPERIOR IN ADHESIVENESS
DUCTILITY AND TOUGHNESS



WARNER-QUINLAN ASPHALT CO.
79 WALL STREET, NEW YORK CITY

Trinidad Liquid Asphalt

For road preservation. Applied hot or cold, it forms a protective coating for road surfaces. Having the stability of the lake asphalt, it should not be confused with ephemeral dust preventives. Trinidad Liquid Asphalt is a permanent constructive agent; it *stays in the road*, and builds up a lasting asphaltic surface. Send for Booklets.

The Barber Asphalt Paving Co.
Philadelphia, Pa.

STANDARD Refined Mexican Asphalt

For Sheet Asphalt Pavements

Delivered to meet standard specifications for Asphaltic Cement. Absolute uniformity and reliability assured.

Standard Refined Mexican Asphalt is recommended by experts in asphalts for its high cementing value and ductility. It is also much less affected than either Bermudez, Trinidad or California asphalts by changes of temperature. It is equal to California asphalt in purity, and superior in this respect to either Bermudez or Trinidad.

Standard Macadam Asphalt Binders

Prepared from Mexican Asphalt

Binder A—Soft, for surfacing hard roads.
Binder B—Medium, for penetration method.
Binder C—Hard, for mixing method.

Standard Asphalt Road Oil

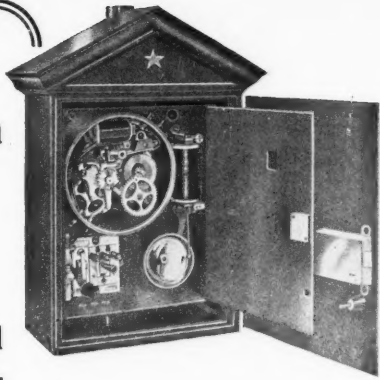
Keeps roads in good condition. In three grades containing from 40 per cent. to 60 per cent. asphaltum

For specifications and other particulars address

STANDARD OIL COMPANY OF NEW YORK
Road Oil Department 26 Broadway, New York

Great Reduction In Price Of This Type

of P. N. I. and Succession 16-Round Fire Alarm Box.



Owing to the expiration of the patents covering this type of box, for which many municipalities have been paying \$125,

The Star Electric Company

now offers this box for the price of \$75. As will be seen by the accompanying cut, the interior arrangement of this box is the same as the box for which many cities have formerly paid other makers nearly double the price.

This box does not supersede our high grade

Star Metropolitan Box

Full description of all kinds of high grade Star Fire Alarm Equipment and Apparatus is given in our *New Catalogue* which can be obtained by addressing

STAR ELCTRIC COMPANY
BINGHAMTON NEW YORK

DAYTON AIRLESS TIRES

—get you to the fire on time

You know how important it is to have a reliable tire on motor fire apparatus; one that can be depended upon always, under all conditions.

Dayton Airless Tires contain no compressed air; they can't puncture or blow out; therefore, the fire laddies are always safe when riding at any speed.

The Dayton wears longer than any other type of tire; it has the resiliency of the pneumatic; has a very liberal mileage guarantee; fits all clincher rims.

Ask us for full information and what other fire chiefs who have used them say about them.

The Dayton Rubber Manufacturing Co.
1004 Kiser Street, Dayton, Ohio

Seagrave Motor Apparatus

is recognized as standard throughout the United States and Canada. We manufacture Fire Department Apparatus exclusively which includes motor propelled combination hose wagons, chemical engines, hose wagons, city service hook and ladder trucks, aerial trucks, and motor pump engines. Send us your inquiries. We will be glad to send you catalogs, specifications and prices.

THE SEAGRAVE COMPANY, Columbus, Ohio

FIRE ALARM AND POLICE TELEGRAPHS

Combination Automatic and Manual Fire Alarm Telegraph Central Office Equipments.



Storage Battery for operating Fire and Police Telegraphs. Controlled by Manual, Automatic and Combination Switch Boards.

Trade Mark, Registered. U. S. Patent Office.

Progress in the Art of Fire Alarm Telegraphy has been identical with the growth of this company. The founders of the Gamewell Company originated fire alarm telegraphy, and during the past 57 years there have been constant improvements, until at the present time the name "Gamewell" is recognized the world over as a guarantee of the highest degree of efficiency in fire alarm, police and special emergency signalling.

Information and estimates may be obtained from our Agencies and Executive Offices.

THE GAMEWELL FIRE ALARM TELEGRAPH CO.

AGENCIES

178 Devonshire St., Boston, Mass.
626 Monadnock Bldg., Chicago, Ill.
1309 Traction Bldg., Cincinnati, Ohio
801 Wabash Bldg., Pittsburgh, Pa.
915 Postal Bldg., San Francisco, Cal.

304 Central Bldg., Seattle, Wash.
Utica Fire Alarm Tel. Co., Utica, N. Y.
The Northern Electric & Mfg. Co., Ltd., Montreal, Can.
General Fire Appliances Co., Ltd., Johannesburg, S. Af.
Colonial Trading Co., Ancon, Central Zone, Panama.

Executive Offices
30 VESEY STREET, NEW YORK

F. P. Danforth, 1060 Calle Rioja, Rosarode, Santa Fe, Argentine Republic.
Trajano de Medeiros & Co., Rio de Janeiro, Brazil.
C. Lorenz Co., Berlin, Germany



SANITARY CARTS

(Patented)

for Garbage, Night Soil, Material from Sewers, Inlets, Etc.

Made for 1 or 2 horses

Write for Catalogue

Geo. H. Holzhog & Bro.
Jeffersonville, Indiana

Draeger Helmets Save 2 Lives

Battalion Chief W. A. Cook, San Francisco F. D., says that but for the Draeger Helmet he wore he could never have reached the two men who were overcome in a nitric acid explosion, and they would have died. Write for full particulars to 426 First Avenue.

Draeger Oxygen Apparatus Co., Pittsburgh, Pa.

Highway Construction

By

AUSTIN T. BYRNE, C. E.

and

ALFRED C. PHILIPS, C. E., Ph. D.

A practical guide to modern methods of road building written in clear, simple language devoid of technicalities and formulae of higher mathematics.

Practical instruction regarding Country Roads, City Streets, Stone Block Pavements, Brick and Wood Pavements, Asphalt Pavements, Footpaths, Curbs and Gutters.

Only a few left

Price \$1.00

Municipal Journal

50 UNION SQUARE

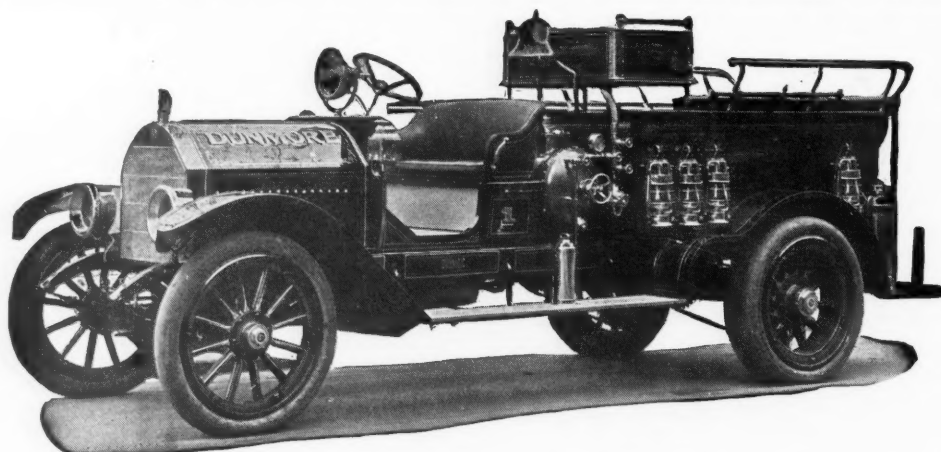
NEW YORK



BOYD

**FIRE APPARATUS!
FIRE PROTECTION EQUIPMENT!
FIRE DEPARTMENT SUPPLIES!**

MOTOR FIRE PUMPS AND MOTOR AERIAL TRUCKS



JAMES BOYD & BRO., Inc.

(FOUNDED 1819)

PHILADELPHIA, PENNA.

FOLLOWING THROUGH ON THE GUARANTEE.

The essence of a tangible, real guarantee on Fire Department apparatus is the ability of the builder,

First: To absolutely control the quality of workmanship and materials employed in the manufacture of the Apparatus.

Second: To at all times have available all parts of the machine for quick replacement when called for.

Third: To safeguard interruptions to fire service by regular inspection of its apparatus by factory experts.

An American-La France Guarantee is followed through in the following manner:

First: By the fact that the machine is manufactured, not assembled, all parts designed especially for fire department service.

Second: Because the apparatus is manufactured, not assembled, the Company controls its stock of parts, which are always available for immediate replacements.

Third: Factory experts are now permanently located in each of its branch offices for the purpose of carrying on a regular, systematic inspection of all American-La France apparatus in service throughout the entire United States.

This service is back of our Guarantee and each expert makes regular reports to the general office of every test, inspection and adjustment in detail.

All motor fire apparatus is not only carefully delivered and the department instructed in its care and operation, but is regularly inspected, tested and adjusted—no charge being made for this service.

AMERICAN-LA FRANCE FIRE ENGINE COMPANY, INC.

ELMIRA, N. Y.

EUREKA FIRE HOSE

Eureka and Protection are Synonymous

The hose that fails when put in service is worse than useless. Put in EUREKA and it will stand the test. Circular woven and uniform, not flat woven like other makes. Send for new Catalogue just out.

EUREKA FIRE HOSE MFG. CO., NEW YORK

**Wax and Para Gum Treated
Cotton Rubber Lined Fire Hose**

MILDEW AND ROT PROOF

Fabric Fire Hose Manufacturing Co.

Cor. Duane and Church Streets, New York

Loper Fire Alarm Company

STONINGTON, CONN.

Manufacturers of COMPRESSED AIR FIRE WHISTLES,
WHISTLE BLOWERS, BELL STRIKERS,
BOXES, GONGS, Etc., Etc.

ESTIMATES CHEERFULLY GIVEN.

Firestone

NON SKID
SMOOTH TREAD TIRES

Cost Most to Build Cost Least to Use

Service Stations In All Large Cities

